THE UNIVERSE

IN ? ONE

MODEL UNIFORM

or

Tales and legends of the Cosmos

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The automatic translation of French into English does not rule out errors in terms and incorrect turns of phrase. Thank you for your comprehension

Astrophysics and cosmology are twin sciences that would like to be accurate. They are, however, too burdened with assumptions, assumptions, uncertainties, and imprecision for us to be convinced of. The following reflection, which is intended to be devoid of any intention of proselytism, has already been and will continue to be subject to frequent corrections and additions.
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These few pages would like to tell the story of our Universe as you probably never imagined it. You must know how to "ask yourself questions as a child with an adult brain," would have said Albert Einstein. He could have added that the child's own, in addition to not yet having a mind full of preconceived ideas, is to think without necessarily relying on words. All the difficulty, then, is to convert these ideas not really formulated, in writing. Moreover, on a vast subject, a need for precision in formatting does not facilitate rhetoric.

This book will discuss what we think we know (5%) and especially what we do not know (95%) about our Universe. Also, to claim to bring together all observable and non-observable phenomena of our Universe in a coherent and exhaustive synthesis, what the physicist calls a unified model, may seem unrealistic in the current state of our knowledge. Even if the approach is less ambitious, shouldn't we talk about a context chart or informal data collection?

If you live on certainties, this book is probably not for you. **Not without some blunders, this book that would like to provide answers, actually only asks questions, with no other ambition than to propose themes for reflection. The affirmative tone meets too often implicitly, the conditional or**

interrogative tone. This is the reason why a subtitle, such as «Tales and legends of the Cosmos», was justified in order to give the subject treated, a dimension more in line with an assumed freedom of interpretation and which can be disconcerting.

This prerequisite being posed and always present in the mind of the reader, how to manage to represent our Universe especially on the subatomic scale? To describe this invisible world, it seems that we can only rely on concepts and on specific terms invented pour interpret what is beyond our feelings. This scientific talk responds to the need to build a physics consistent with what we are given to observe. But, in quantum physic (the physics of the infinitely small), we quickly realize that our vocabulary is not really appropriate and that it often becomes necessary to reason by comparisons, images, allegories, metaphors. Our thinking reveals its limits at the same time as the failure of words. The difficulty is to imagine and conceive, what happens on a scale where things don't really refer anymore to what makes our well-known reality. In quantum mechanics, talking about corpuscles, orbits, spatial positioning, gravitation seems no completely appropriate, but nevertheless allows us to approach the Universe in a dimension where the call to the imaginary becomes unavoidable.

Everything that follows is the fruit of a reflection whose added title «Tales and legends of the Cosmos» may suggest that it wants to be devoid of any scientific pretension. In this field, history has taught us that what we believe in is not always certain. Each will find, perhaps, his share of truth if not otherwise, new avenues of reflection, in the extension of Einstein's relativity and the surpassing of quantum physics.

As a starting point, one way to imagine what the Cosmos would be called here multiverse, would be to consider it as a timeless concept, a potential framework without physical reality where energy is not able to manifest itself. The idea of container is inappropriate. This concept of multiverse Cosmos allows mainly to justify the existence of binary systems of universes in quantum symmetry, (see below the meaning given more precisely to these terms) duplicated to infinity, without links between them.

Sowing the cold and the warm, both luminous and unfathomable darkness, sometimes calm and sometimes violent above all, indecipherable on its ins and outs. This is the feeling we have of a Universe that continues despite all the advances to leave us in the ignorance of the essential. Since then, the idea for the least counter-intuitive of relativity allows us to guess a discrete, multi-faceted symmetry, too little accessible to observation to make consensus.

Related to the concept of Cosmos that could be described as multi-universes (see development), our Universe would be only one universe among an infinity of others Universe without connection between them. In other words, an «event» of a disconcerting banality in an interlacing of phenomena whose comprehension, lack of broader context, seems to have to remain in the state of thought exercises.

Faced with paradoxes and scale problems, we are reduced to formulating hypotheses too often.

The major problem is that, built around a principle of cause and effect, which is difficult to refute even though it is full of uncertainty, our inevitable scientific logic no longer seems sufficiently efficient or even appropriate. While it adequately explains a number of observable phenomena, it would require a rethinking to emerge from an almost iconic classical physics.

The imaginary that is not lacking in creativity, could it not help us to rethink a consensus that is based on a model far from being unified and proves insufficient to satisfy our quest for what we are?

We can boast a better understanding of what is happening on the atomic, molecular and nano-structural scales. New nanotechnologies at unprecedented scales (100,000 th of mm) are proving particularly promising. These advances that explain the state and transformations of matter make today's cutting-edge chemistry. But on the origin, the evolution and the very purpose of the Universe, our advances, for lack of sufficient means, bring nothing really decisive and remain for many in the state of hypotheses to the point that we may have questioned the reality of what makes our universe as we perceive it.

"Regarding matter, we have been mistaken. What we call matter is only energy perceptible by our senses. There is no matter." (Albert Einstein)

"Everything we call real is made of things that cannot be considered real." (Niels Bohr)

This book, like a stone into the «frozen pond» of astrophysicists, tells us an unfinished legend, that of our own history since the dawn of time.

"I would write here, my thoughts without order but not in confusion without purpose". According to Pascal

This reflection purposely proposes, without too discursive order, a «general theory», by infiltrating the «hidden face», source of confusion, of our Universe.

To paraphrase Pascal

Trailer

(Image Shortcuts and Stops)

As a living organism, we see ourselves as occupying a tiny part of space and our life is perceived as a tenuous fraction of time. Our reality is what we are, a little space and time. It is by reference to these two notions that we represent our Universe and all that it contains: a space/time made of energy in various forms.

Today, we know how to conceive beyond what our senses dictate to us, to give a meaning that is both intuitive and thoughtful, to what we are given to observe. The whole difficulty is not to err, by persisting without restraint, in a culture of the abstract. Without denying the classical relativistic physics and and that, full of promise, of the quantum world, how to open a new way of reflection and widen the discourse?

Let us start by taking stock of the situation, based on 2 hypotheses that are anticipated as possible openings for future advances:

- The hypothesis, taken as a starting premise, of a relative space (that is to say that varies parallel to time), circumscribed but without a central point or accessible edge. This disconcerting space/time that represents our Universe is made of something difficult to define: energy presumed in quantum symmetry (or more specifically in symmetry rupture). Although inseparable, the two symmetrical states that make matter and antimatter, would remain no fusional until the required conditions are made. Gathered, these conditions will mark the end of our Universe.

- The hypothesis taken as a second postulate of a Universe that could be finished as suddenly as it started. A discrete spatiotemporal shift or quantum chirality would originally distinguish two symmetrical quantum states of matter, one of which would remain forever essentially, hidden from our eyes (antimatter).

A postulate is by definition, a foreshadowed true assertion, presumed true but not proven. It is therefore necessary to see (this is the main axis of this reflection) how these two postulates can be integrated into an advanced performance of our Universe as coherent as possible. Such a paragon would be to overcome the imperfections and inadequacies of our standard cosmological model. If there is broad consensus, let us recognize that this is primarily a default choice. In reality, our draft cosmological model, as remarkable as it is, raises questions because of its absence of unification marked by inadequacies, inconsistencies and lack of links.

We are the evolved and complex product of an organic chemistry that has a vocation to manage itself and that makes living matter. As such, our observer status does not give us access to anything other than what we understand as our reality. But what credibility can be given to this reality, if we accept some advanced features of quantum mechanics such as the idea of decoherence (see chap. XXIX) or that of wave/corpuscle duality?

Two «dimensions» of space/time invested for one by matter, for the other by antimatter and representing two complementary symmetries correlated in an imperfectly shared time and space. This could be the definition of our Universe which would not exist, detached from this quantum symmetry.

Whether the elementary particle is considered as an entity of unbreakable matter or an indivisible quantum of energy, it would imply that it cannot be assimilated to a part of space and that it has no measurable temporality (neither past nor future). It is the energy transfers that make us locate and relativize. Also, without interactions between fermions (particles of matter), space/time, this concept that allows to describe the dynamics of our Universe, would have no reason for being. The universe would then have no history, would be static, immutable and deprived of mathematical representation in the absence of an observer. Some of the primordial energy having acquired mass properties ($E=mc^2$) during the radiative entanglement phase (see development a few pages later), models and modifies space/time. The elementary particles would possess a hidden, complex structure, product of the radiative entanglement of the beginnings of our Universe. This configuration in wave packet, immanent to the big bang, would control their behavior and give them properties interpreted as representative among others, mass, charge, spin. This quantum code can make assume the existence of a quantum symmetry that does not appear at the scale of the constructed matter.

What is true for matter, is equally true for antimatter that manifests itself to us discreetly during nuclear reactions or in the form of creation or annihilation of pairs and by unrecognized gravitational effects, by default attributed to a very hypothetical dark matter. Space/time would be in some way, made up of 2 inseparable and complementary components, in an interface that overlap, overlap and interact with each other, outside our possible field of observation for the most part. How could we consider this complementarity/mirror or interface of space/time that escapes our sight? At the present stage of our Universe's evolution, it can be assumed that the conditions are not fulfilled for antimatter to be (this is a chance for us) in situation of annihilating itself with a matter that makes and conditions the observer we are. Yet the disappearance of any form of radiative entanglement should mark the possible end of our Universe in this somewhat disintegrating vision. This end, called here final collapse, would become inevitable once all the particles (massive or not) of our standard model and quantum mechanics have been accreted by a growing population of mega massive black holes. The Universe frozen by absence of interactions, without hot spot, would no longer be significant in space/time. Our Universe will then have completed a cycle that had no reality for an advanced form of life, a fortuitous among many others in the evolution of matter destined to coalesce with its quantum symmetry.

The idea of multiverse in cosmology is not new. But it is not taken up here, in the sense of a population of universes in a shared environment whatsoever. These universes cannot be related to each other and have no links in terms of time and space. They somehow ignore each other and can only be considered as uniqueness. In other words, our Universe is not part physically in an infinite set of universes.

The Cosmos multiverse is a concept that underlies the idea of infinity (infinitely small as infinitely large) and non-temporality (in other words, absence of beginning as well as end). The infinite as well as the absence of space and time are notions that reject a priori our way of thinking and that cannot properly interpret our scientific methods and more particularly our mathematical tool. We therefore remain prisoner of an advanced model which is the subject of a broad consensus but which, although incomplete and not completed as it is, does not really open an alternative.

The multiverse Cosmos mentioned in these lines, is in no way significant events or exchanges of information and has nothing similar to the exponentially prolific "multiple worlds" proposed by H. Everett. No manifestation of energy can be aggregated. And what does an empty space of event mean? Even the absence of space lends itself difficult to the definition of a Cosmos without physical properties and which then in our eyes, everything is virtual. The vacuum is for us a contextual framework made of kinetic energy, carried by radiation (light to make it simple) which have the particularity of being able to interfere with particles of mass more or less dispersed, able to interact with each other. Partially unexplained gravitational effects could imply the presence of antimatter even if we are not able to detect it directly in the observable. Rightly so, it was possible to write that the same void of any mass particle nevertheless remained charged with energy in the potential state. In the form of a power energy field, could this energy -called empty- not be potentially shared between matter and an antimatter that seems to have disappeared from the scene (see chap. XIV on dark matter)?

The multiverse Cosmos considered in these lines, then becomes a concept, a non-physical entity, difficult to apprehend. It is supposed to «contain» potentially an infinity of binary systems of universes in quantum symmetry. But it would be also contained in all Universe, discreetly lurking in the depths of all forms of energy.
The universe/cosmos prescribed by our standard model leaves a feeling of unfinished business. The binary system of universe in quantum symmetry considered in this reflection reconciles both the «sectoral» Space/time of special relativity, the uncertain Space/time of quantum mechanics and the flexible Space/time of general relativity. In other words, this form of so-called discreet symmetry would represent the fundamental quantum property from which all quantum mechanics flows. It prescribes for any form of energy a mass, a potential state superimposed, equivalent, discrete, with opposite quantum numbers but which would remain «locally» out of reach for the observer we are.

The concept of energy in rupture of symmetry, invites to go beyond a certain intellection of physics that is familiar to us. Recently we have learned to no longer refer to a space considered absolute and to a time perceived as universal. It is then necessary to imagine the energy as a «state» in the broadest sense, or more precisely an uncountable superposition of potential states. Any object brought back to the most reductive level (that of the quantum «dimension»), seems fundamentally deprived of spatial reference and temporal development. In fact, time correlated to space becomes the business of each observer, reported to his own scale and to the one which he has no choice but to take into consideration.

When it does not reveal quantum symmetry, this energy evokes the multiverse Cosmos. In rupture of symmetry, it would represent a system of two-component universes, involving discrete interactions between matter and antimatter.

Any event, any object are described in terms of spatial coordinates and significant duration compared to a circumscribed event context, in a logic of cause and effect. Big-bang and final collapse can hardly be described as events insofar as they are necessarily devoid of spatial references in an impossible context to conceive and devoid for one of anteriority, for the other of future. The true singularity: it would be our Universe, an event closed in on itself to the point of taking a no open curvature. We can then say that, related to the concept of multiverse Cosmos, it is logical that this binary system of force fields in symmetry, brought back to the quantum scale, stands out from a macroscopic reality that is familiar to us. What amounts to agreeing that the world in which we see ourselves, would be only an appearance, an interpretation of events whose history has neither beginning nor end that can be attached to a broader clearly defined context.

How and why would our observable Universe fit into a binary system carrying quantum symmetry?
The best is to imagine the multiverse Cosmos as a continuum of ruptures and reconstructions of a symmetry, carried by any binary system of universes. Our logic, built by references to space and time, loses its points of support. This is normal, we are talking about a virtual multiverse Cosmos where space and time have no hold. Is this more difficult to conceive than a demiurge or a family of deities invented for the needs of the cause? For many of us, our knowledge has evolved with scientific advances and should give preference to this kind of expanded cosmological model. Before, we were blind. Let us consider that we are now only one-eyed, perceiving the most conspicuous facet of the world around us.

How can we imagine the story of a a binary system of universes in quantum symmetry? It would be ultimately that of the recognized matter and also of a particularly discreet antimatter. It is to one of these two forms of energy in rupture of symmetry (matter), that we attach everything that makes our reality. Could it be that the story ends when matter and antimatter will be combined, by remedying a presumed chirality* that would explain our Universe in all its complexity? such a process of reunification is however far from being approached. This mass symmetry is perceived through certain exchanges. Thus 2 photons without mass can substitute mainly a massive charge particle - (the electron) and its charge antiparticle + (the positron) … and vice versa.

**Chiral*: *whose object and its mirror image constitute two different forms that cannot be superimposed in a mirror. Chirality can be related to a simple glove problem. All children have already faced a problem of chirality by putting the right hand in the left glove and vice versa. A glove is a chiral object because it is not superimposable on its image in a mirror. But this comparison ignores time, which is not the case in our report, where time becomes a determining factor in this chirality (see development in Chap. III).*

The chirality of symmetry is due to the fact that each symmetry has been set apart from the other by equipping itself with an equal share of opposite electromagnetic charges without doing so in a time shared identically. This means that matter and antimatter can only interact occasionally (mainly during weak interactions and creation/annihilation of pairs) and evolve in parallel in dimensions that are unique to them but will be brought to join at the end of a process that makes the evolution of our Universe. It should be noted that chirality is a very present property in organic chemistry, which deals with carbon-based molecules but it is also the case for other molecules of similar complexity. Curiously, a form of molecular asymmetry or chirality is ubiquitous in biological phenomena. Although chirality plays a major role, it does not seem to be limited to the chemistry of the living. Without chirality, point of remarkable symmetry; everything becomes or remains potential, including this «thing» undefinable and totally counterintuitive that can take the form of a universe (in the eyes of the observer it hosts) and we call energy.

Let us try to be more explicit on this idea of chirality. The matter in gathering calibrates, in all places of our Universe, differently space/time. By its presence, the assembled material gives the impression of lengthening time and shortening distances. Antimatter, which is not likely to escape the principle of relativity, should do the same. However, since it has been distinguished from matter by creating pairs during the phase of radiative entanglement, nothing suggests that it should distort space/time completely identical. This would result in a superposition of quantum symmetry references that influence each other but whose effects are largely beyond our control. This problem is covered here under the term chirality.

We do not have the capacity to discern what is happening in such a context of “universes” in quantum symmetry. However, exchanges would come true in a discreet way, through difficultly undistinguishable interactions marking the border between the «slightest fraction» of these energies correlated by their symmetry and the multiverse Cosmos. The most insignificant part of energy contained in our Universe, possibly goes far beyond what we consider as its elementary constituents (see chap. IV: wave packets). The concept of particle refers to presumed invariant values, such as Planck units and the speed of light propagation. These constants allow to confer to the energy, a physical presence perceived in the form of waves (energy fields) or corpuscles (energy quanta).

How to define what energy is? It presents itself in our reality as a protean dynamic of indeterminate origin and unexplained basis. But we can also consider that energy is fundamentally a superposition of potentially possible and interacting states, from which we distinguish only what we are in cognitive and conceptual capacity to interpret. The energy that we have so much difficulty to represent ourselves, is not representative under this definition, of what makes our observable reality. Neither our standard model nor some theories advanced in search of unification succeed in giving a complete definition of what energy is fundamentally.

Our physics with its problems and inconsistencies of scale, can also be conventionally a way of outfit a reality that belongs only to us and suggests interpretations expected to evolve as progress is made.
Any particle of matter, any object can be understood as a node or a point of confluence of interactions more or less remarkable.

Quantum leap, tunnel effect and quantum entanglement go against our need to locate everything and disrupt the classic design that we can hardly get rid of a three-dimensional space. The particles, « nodes» or "points" of energy not really localizable, can be then considered as an artifice necessary to give visibility to certain not directly observable phenomena. **We may wonder whether the particles would not simply be mathematical models, given mainly in terms of fractional electric charge, energy, spin and helicity, "color", "flavor". The fact remains that without these indicators, we would not be able to transcribe in clear the nature of the interactions and the level of energy they represent** (see chap. XXIX**).**
We explain them by the agreed presence of forces (electromagnetic, weak, strong) and gravitational effects in relation to the massive nature of the bodies that crisscross our Universe. Could these forces not be the result of discrete interactions because no discernable, between two quantum symmetries? In our reality, made of space (or energy fields) occupied or not by matter, the gravitational force represents the phenomenon that gathers by distorting interstellar space. What we perceive as a constantly accelerating expansion,

would it not translate an energetic depression of space by gravitational grouping of bodies and densification of matter.

Our standard model, which satisfies many predictions, is far from being an exhaustive theory. In search of a certain coherence that is lacking, could not one make the hypothesis that the elementary particles of matter representing the primitive bricks of matter which are today, quarks and electrons would be «packages» not separable primordial wave? A short-lived event, called here phase of radiative entanglement and which could be assimilated to the Planck wall, would have marked the very beginning of our Universe. These «bundles» of waves smoothed, without marked frequencies, somehow latent, by modifying their properties by radiative entanglement, potential, would have become inseparable. Although these qualifiers are somewhat inappropriate, they allow to conceptualize what originally had neither spatial context nor temporality and refers here to the notion of multiverse Cosmos. These wave packets make since, particles and antiparticles, irreducible entities of matter and antimatter. Having lost in intensity, the non-entangled waves have become the current electromagnetic waves to which we also give the image of the elementary particle of matter (fermion), a corpuscular representation called photon. The mass effect of this primordial wave entanglement results in charge interactions. These last ensure a certain durability to the constructed matter (strong nuclear force for the quarks within the atomic nucleus and photoelectric effect for the electrons) which presages the existence of a link between the electromagnetic force and the gravitational effects. This definition of the elementary particle; a packet of waves in constant and differentiated interactions (whether quarks, antiquarks, electrons or positrons) with an electromagnetic field that makes the space so-called empty, would allow to consider a quantum mechanics more in accordance with a standard model to be rethought.

Matter would be nothing but a change of state of a part of the energy without mass resulting from the Big-bang after a phase called here phase of radiative entanglement. The latter could be defined as the circumscribed interweaving of primordial waves with the appearance of charges (the state of spin determining the state of charge) that will be at the origin of electromagnetism when electric field and magnetic field are distinguished from each other (see chap. IV). The radiative entanglement of the early Universe would have so, created the particle of matter by conferring on it, in particular, a significant mass of intrinsic movements and corresponding to its inertial capacity. By realizing the

space/time and modifying the properties of it, this mass thus generated and carrying an electric charge and magnetic fields would be, at the macroscopic scale of massive bodies, at the origin of the gravitational effects (see chap. XVIII). At the same time, an antiparticle would be correlated to any fledgling particle. This interweaving of primordial waves or radiative entanglement into an elementary entity of mass would confer on the particle as its antiparticle, the potentiality to manifest under several so-called superimposed states. But in fact, only one state is consistent with the reality of the observer. The antimatter that excludes itself from this reality remains out of reach for him.
Antimatter does not reveal a remarkable physical presence in the palpable, tangible world that makes, within the limits of the observable, our environment. It does not manifest itself in the so-called «vacuum» energy. However, antimatter interacts with matter and is reported to us especially during nuclear reactions. Although not detectable, it seems however susceptible to explain incomprehensible gravitational effects, other than by the totally hypothetical presence of an unknown, invisible, undetectable matter called by default, dark matter. Particles and antiparticles when they meet annihilate and transform into pure energy, devoid of mass in other words electromagnetic radiation. In doing so, antimatter can make believe that it participates in vacuum energy. However, it would seem wiser and more coherent to think that it occupies a hidden dimension, in a way parallel or superimposed on that of matter (see chap. XI). This leads us to admit that this contextual framework that is space/time, filters in a way, what we observe and reveals only what we are able to understand or interpret.

It is a phenomenon that today represents a recursive form of radiative entanglement. Under certain conditions, the photon, quantum of energy associated with EMW, is able to transform into a pair particle-antiparticle. Nothing therefore forbids to think that the particles of matter that we define mainly by their mass, could originally be the singular product, called here radiative entanglement, of a potential energy in the latent state, not revealed. This energy that is not quantifiable, not localizable and which has no reality for the observer that we are, would have given our Universe, the tangible properties that we recognize it. Once the Planck wall is passed, some of this potential energy not entangled in mass entities and perceived in an exclusively kinetic state will be brought to interact with the mass particles thus created. Associated with electromagnetic waves, this energy, which has become a vector of force,

travels through interstitial space, improperly called empty space, between matter.
This virtual energy, representative of a multiverse Cosmos that cannot be defined in terms of space and time, would thus be at the origin of the first particles of materials that will become the fermions and realize the material built in interaction with the EMW.
Before this phase of radiative entanglement by creation of particle/antiparticle couples, and therefore before matter exists, how could we conceive of space and time? Space/time is a framework that makes sense only because it allows, in terms of mass, charge and quantum numbers, to relativize everything that seems to participate in our environment. The notion of space/time is our way of giving a framework to what we perceive as the displacement of bodies, the changes in matter with the forces that it implies. On the other hand, no reference model allows to describe the potential energy of origin that gave birth to our Universe. Also, the concept of multiverse cosmos allows to give a framework that can only be virtual, to what would flow from our universe. Indeed, our vision does not go beyond a space/ time that locks us in a reality that belongs only to us and begins with the supposed Big-bang, called singularity, failing to be considered an event in the classical sense of the term. This Big-bang is supposed to mark the occurrence of space and the starting point of time. It will mark a phase transition from a latent energy, without remarkable properties and which we associate here with the idea of Cosmos multiverse.
This primordial energy, potential by nature, would have given its physical dimension to our Universe with the appearance of the first particles and the first charge interactions generating electric currents and magnetic fields
.
After the initial phase of radiative entanglement, the free radiations involved in the phase of radiative entanglement but not entangled in particles and antiparticles of matter, would have quickly lost frequency due to the first exchanges with the newly created matter. It is possible that they could not continue to be entangled in elementary particles of matter, for lack of sufficient energy. Since then, these residual waves have become the OEMs we know, and they continue to interfere with these bundles of entangled waves, which are endowed with mass that make up matter (and antimatter). They have become vectors of kinetic energy and now interact by diffraction, absorption and emission in contact with matter. They operate by elastic scattering, photoelectric effect, Compton scattering or creation of pairs. In doing so, they contribute to putting the so-called void space in a growing energy depression

(see chap. IV). On the other hand, the presence of matter influences the properties of these EMW, residual radiation of the Big Bang, by conferring on them a relativistic reference speed called light speed and a trajectory of curved appearance configured by the gravitational fields crossed. These gravitational wells will lead the EMW to be absorbed by mega «quantum» singularities called black holes. Emblematic elementary entity of electromagnetic waves, the photon has no corpuscular reality since it is not perceived interacting with matter.

Kinetic energy and mass energy are potentially substitutable to each other ($E/m = c^2$). This explains that a notable fraction of essentially kinetic energy, is assimilated mass in the «weight» of a composite particle or an atomic nucleus. The same is true for any object. In fact, this part of energy that is missing if we sum up the constituents of the atomic nucleus for example, is found in the force interactions that ensure the link between the elementary constituents of the nucleus that are the quarks.

Attraction of bodies and apparent inflation of space describe two phenomena that would lead to a reductive vision of our Universe, in relation to our condition of observer making integral part in any observation device. Gravitation and expansion would be the contradictory image of what we will develop further, under the term retrograde dispersion. Gravitation is mainly noticed on the scale of stellar bodies and galaxies. On the other hand, the depression of space interpreted as an expansion of it, is only really distinguished at the macroscopic scale of the sets of galaxies. For these two phenomena which can be considered as one, everything is thus a matter of observation scale, in a Universe that seems to expand, to better collapse.

Retrograde dispersion can be defined as an illusion of dispersion. The evolution it represents will lead the Universe to return to its starting state by gathering and unifying all forms of energy.
It gives our Universe an inflationary appearance and implies a certain homogeneity more particularly remarkable on a very large scale. From this point of view which seems a priori not in accordance with the measures of the observer, the so-called problem of the horizon of the Universe, would turn out to be a false problem (see chap. XII et seq.).
Retrograde dispersion also solves the so-called problem of flatness, since the curvature of space related to the masses present, must be overall everywhere

the same, regardless of the point of observation. The problem is that our gaze can only embrace the Universe by mixing distant past and present proximity. Distant news escapes us.

This somewhat dissenting development of our Universe comes down to a process of deconstruction of what constitutes the space-time. Time, indissociable from space, will stop when all the energy of our Universe will be about to return to its original state, through a phase transition called a black hole. A black hole would represent the last stage before confrontation with an antimatter pending reunification. Perhaps, to put it simply and keep the same terminology, we could talk about white holes just as discreet to us as antimatter. The energy will no longer be in search of a symmetry allowing it to return to its original state. The final collapse of mega-massive black holes (MMBH) after regrouping and densification of matter, in a cooled concentrationary Universe, is an ending scenario that cannot be ruled out.

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Foreword

Clearly, our Universe is beyond our understanding by its very nature and complexity. To want to explain the purpose of this, should logically be a strictly scientific approach. However, let us recognize that excluding any philosophical or metaphysical thought from this reflection would be a challenge.
With all the reservations of convenience, these few lines are not absent from considerations on the margins and critical annotations. The following comments would describe and bring coherence, in as simple terms as possible, what certain scientific theories and hypotheses which have inspired this essay, apply themselves to wanting to demonstrate. Although they do so in a more elaborate way, they are often less accessible and not free from paradoxes and shortcomings.

To popularize ideas that appeal to particularly abstract notions or that rely on relatively hermetic mathematical expressions, can leave one perplexed. The data for this are often insufficient and inevitably lead to interpretation and extrapolation. And as always, going beyond what makes case law in the scientific world, can be considered, a priori, as a predisposition to speculation. For personal convenience and for the sake of clarity, there is rather sober references to mathematical formulations. Developments in nuclear physics and quantum interactions will be concise.

But can we make simple in this a field so complex, misunderstood and yet to be explored in many ways? Black holes, dark matter, dark energy, unfinished unification theories, universe beyond the visible, superposition of states, virtual particles... Is everything really so obscure and elusive? Only one thing is certain: nothing can be taken for granted on subject as vast as it is confusing, and this thought which wants to be exhaustive, may seem relatively dissenting. Nevertheless, it is an anthology of objections and suggestions. Indeed, number of advances partly based on assumptions, would require validation and many questions remain unanswered.

This essay, undoubtedly, insufficiently developed, and which invites controversy, proposes an original and relatively logic approach of our Universe in the continuity of current knowledge. It is also a way to revive a debate that is far removed from the daily concerns of our existence. Undoubtedly, our priorities are called to evolve, as our living conditions change in a society that is more open, more critical and more curious, but still not very egalitarian and just as fractured by extreme behaviours and ideologies.

There are, however, a number of obstacles to this development, not least the inability to go faster than the established traditions, facing disruptive discoveries and new technologies. Poorly supported convictions, dogmatic beliefs, natural inertia in the face of change have always obstructed progress in knowledge and concerns in everyday life are first and foremost our most basic needs (food, protection, social integration…). How to have leisure and share it at best, how to enrich one's heritage, how to satisfy sometimes repressed desires, how to carry out projects not always within our means etc.? All these concerns have an unfortunate tendency to invade our minds to the detriment of less existential subjects such as self-awareness or the problem of the Universe. Deepening a reflection on the origin and the raison d'être of our Universe requires an availability of mind too often hindered by such preoccupations classified by necessity, as priorities. Cosmology is a subject that does not address any of these essential needs, the satisfaction of which is always rewarding. Let us recognize that the mere fact of wondering about the Universe implies being able to disconnect from a heavy reality by freeing yourself for a time of these fears or apprehensions. How can we take advantage of and develop inventiveness and critical thinking while being aware of our limitations and take the time to look inquisitively at the world? These skills, often insufficiently present but necessary to progress in the knowledge of physical phenomena who make the evolution of our Universe, are revealed in fact, selective not to say elitist. No wonder that the Universe remains today, a matter of background reflection or matter of religion, for almost all the thinking heads of our planet.

It is to be hoped that the pollution and over-exploitation of our planet's unequally shared resources, bring us to realize the fragile nature of the little-known world that shelters us. Climate change is a reminder. An uncontrolled overpopulation, often a source of conflicts of interest, does not go quite in the desired direction.

Some of the commonalities found in Titles I and II of this paper, and a number of reminders on basic concepts, have no other justification than to facilitate the layout of ideas which are sometimes difficult to develop. The essence of this reflection would like to combine some advances and theories proven but not

always convergent and achieve to reconcile particularly quantum mechanics and gravitation of bodies.
The style for direct whatever it is, does not clothe anything that can be received as absolute truth, apart from knowledge presumed to be firmly established and which inspired these few lines.

The logic that drives this reflection, starts from the principle that there can be several realities.
It will often be about forces, particles, dimensions and other things qualified as ***virtual.***

Above all, and we will not fail to return to it (see in particular the parallel with the idea of nothingness or emptiness in chap. XXXI), it is important to understand the alternative meaning given in this reflection, in the virtual term. Virtual is an adjective usually used in the reductive sense of pure product of imagination as opposed to reality and without effect on it.

For lack of a more appropriate term, the virtual developed in these lines, stands out from this definition with the connotations of fiction. This key idea of virtual can then be understood, depending on the context evoked, as the indiscernible or inconceivable part of our Universe, the hidden interface of our Universe, on which quantum mechanics would rest, in a concept of Cosmos multiverse.

But, how to make link between:

- on the one hand, accessible information about matter (what has mass) and the interactions of matter (forces present)
- and on the other hand, hidden information described as virtual because it is not dependent on space/time and that is based on induced hypotheses without a directly discernible link with matter. This unrecognized information that would represent the undisclosed root cause of a physical Universe that we associate with a spatio-temporal dynamic, evokes in this reflection, a virtual reality ontologically out of reach. It is a way to avoid having to refer to notions without possible extension such as those of nothingness, infinity, timeless or singularity.

How then to lift this border between our real world and this virtual «substrate», without physical reality, so difficult to define, other than in terms of hypotheses, potential forces or latent energy? Understanding the reason for being, the origin, the intrinsic nature of everything seems to remain above all an exercise in thought. How to connect in a scientific logic, this hidden component of our Universe, considered as virtual to what makes our shared reality? What we see is very real and is not an illusion … Except that we dress it at our convenience with light, sounds, colors, temperature deviations, degrees of dangerousness and other felt. Today, we begin to realize that we perceive only a narrow facet of a Universe that we look, in a way, with a very narrow view. Considering our condition of observer confined in an empirical and restrictive vision of its living environment, it can hardly be otherwise.

*The **virtua**l evoked in these lines, does not appear in our reality which is a materialized world to which we are bound by body and thought. The terms to talk about it remain for some to invent. Therefore, in order to remain credible, our ideas must refer to the palpable and the felt. It will therefore be necessary*

- *To make **parallels and to use metaphors that appear in purple characters (or italics for editions in B and W)** to describe what is similar to the virtual, or to avoid getting bogged down in the abstract.*
  Thus, link/brane, energy node or bubble, funnel, barometric tide, rope, chirality… are terms that are not precisely adequate but that nevertheless make it possible to develop an idea in a context relatively distant from our reality.

- *If necessary, use "terms" in quotation marks when they are not really appropriate.*

In Cosmology, man is readily regarded as a mere passive observer. It is to forget that it can also be seen as the resultant endowed with consciousness, with all that preceded it in the Universe it occupies. He is not only in this Universe; he represents, in its own way, the memory of it. Of course, his limited field of vision and a lack of sustainability justify an incorrigible amnesia. However, a recent and ever more obvious awareness, seems to awaken memories. .... But are they memories or fantasies?

Please, note: ***Writted with red or in bold typeface*** **(**for the editions in B and W)**:** ***key ideas*** … *that can be disturbing!*

I <u>A starting point witch something existential</u>

(Our advances sometimes only move questions)

To give a dimension to something is to compare it to something else, usually smaller or larger. The same applies to the evaluation of the duration of one event.
Confronted with the concepts of infinitely small or infinitely large, this relativity shows its limits. The remark also applies to the chronology of events if one considers a past without beginning and a future without term.
Moreover, the hardly predictable course of events in a logic of causality which questions, induces uncertainty in any spatial location and seems exclude any formal evaluation of duration. The relativity discovered by A. Einstein in a context of countless referential but interdependent, reflects the volatility of our observations. This relativity is all the more difficult to equate because it carries within it, the virtual impossibility of moving at constant speed and simultaneity in a multi-repositories Universe. We could come to doubt a predictable reality that is unfolding… on our scale.

Nevertheless, as soon as he rejects any reference to the supernatural, the mind develops an amazing capacity to seek answers to the great philosophical as well as metaphysical question thus summarized:
How can we understand this raison d'être which leads us to wonder about our origin and our condition?
Or, in a more pragmatic formulation: **What does this matter of which we are constituted and that shapes our perceptible universe?**

The logic that governs us, can be defined as an artifice of thought or innate mental process allowing to connect what our senses perceive giving us an intelligible a planning for what makes our living environment. But this advanced logic which places the human being at the top in the evolution of the living, tends to reject what appears counterintuitive or does not fit in our capacity of analysis. Pragmatic above all, it becomes quickly restrictive until subjective and locks us in a world with the appearance of reality. Despite this, this logic allows today an approach to a deeper, patent-free reality, based on the idea of superposition or plurality of states (see chap. XXIX). It is a key notion in a quantum mechanics symmetrically marked. Classical relativistic physics would be the extension by change of scale. However, uniting one to the other is on many points far from being done.

How to apprehend on the substance, a reality that we suspect to be largely inaccessible to our form of thought? Should we not disconnect our intellect from its intuitive logic, built on the felt? This illogicality seems difficult to conceive, we come to think that such a subject justifies a dialectic of the abstract that is its own and tools that remain to be invented. We will do so with the means at our disposal.

The chapter XI on anti-matter goes off the «beaten track» of astrophysics and provides an insight that would justify that it be addressed beforehand. The same is true of Chapter XI, which reflects on the consensually but subjective side of a standard model with too much conditionality.

Humanity never ceases to wonder why an environment it tries, not without some success, to manipulate for its benefit. For a long time, the earth was placed at the center of everything. And to explain his presence, his origin and reassure himself on his future, man imagined a supreme Being that he wanted in his image without really succeeding in representing himself. Convenient subterfuge, especially for those who want to govern and control a group that adheres to it! **In all the history of humanity, what religion does not rhyme with obscurantism, enslavement when it is not with perversion?** Yet these infantile beliefs, which are based mainly on superstitions and mystifications, continue to affect many judgments and behaviors. It is precisely because they claim to explain or hide what we cannot understand!
Fortunately, in recent decades, man has come to ask himself otherwise relevant questions, suggested by the experience gained, the development of science, technical progress and undoubtedly a freer and more elaborate method of thinking. He then discovers a distant universe beyond the stars and probes, at the same time, the extremely small matter that surrounds it and from which it is constituted. Therefore, planet Earth is no longer the focal point of a “world” to discover… and everything changes.

Despite the reluctance and taboos of religious myths invariably refractory to the development of knowledge, the human being has become able to imagine our solar system, then the galaxy that hosts it. He realizes that this galaxy is just an insignificant dust in a huge cloud of clusters of galaxies that, in appearance, are fading faster and faster as a myriad of soap bubbles would swell next to each other. This is the last approached scientific representation of our Universe as we discern it.

In a first approach, this expansion seems to accelerate exponentially. We would therefore be tempted to consider a past time when it represented only a «point» in a space to occupy. There, our faculty of imagining stops, to explain a supposed original Big-bang. And what then to say about the destiny of our Universe?

But what good is stopping in such a good way. Why not claim an infinity of Universes like ours (idea of Cosmos multiverse) and open to other conjectures or alternatives that may seem unusual at first? It would be a way out of such a self-centered and rewarding attitude towards the human race, which would see itself at the center of everything. Indeed, how could it be otherwise for each of us? This would also allow to advance some hypotheses on this Universe which seems as complex of conception as of functioning.

Let us see now, how to go further in this uninhibited vision of the Universe and which would free us from so many prejudices and confinement.

II The Universe plays hide and seek

(A mega game in search of partners)

Is the degree of intensity of phenomena in astrophysics evolving towards ever more disorder? On the contrary, does it not translate the search for a certain order and balance, preferred to chance and confusion? The response, developed here, would accept both views, depending on a certain scale context. A definition of entropy would be to consider that it summarizes all the phenomena that will lead the Universe to its destruction. Although without clearly established link, a Big-bang could be interpreted as the replica of a collapse of a Universe or the rebirth of a disappeared Universe (idea of cyclical universes).

Our understanding of the Universe within the limits of the observable, is based on a certain idea of time coupled with the notion of space. These 2 indicators make it possible to describe many phenomena that carry out the evolution of our Universe. However, it seems that they cannot serve as a reference for intriguing black holes phagocytizing our universe and for the occurrence without clearly established cause of it. These two «events», because they remain unobservable as such, are considered as singularities, in a way «threshold» closed on the future for the former and closed on the past for a big bang that we are unable to define. Beyond that, us would come out of space and would escape the grip of time. These two singularities, by their nature closed to any introspection, have every reason to stand out from the laws of the quantum mechanics and of the classical relativistic physics. Difficult to integrate into our standard cosmological model, they are an obstacle to any attempt to unify the so-called fundamental forces. Could there be, however, a connection between them? This would mean that we interpret in 2 different ways, one and the same singularity or conjecture. What relationship then between the opening of a Universe (Big-bang) and its possible closing (collapse of black holes in a space in total energy depression)? In the absence of a pre-existing physical state at the opening of time and of any space-time context following the final collapse, it would even seem inappropriate to speak of events marking the beginning and end of our Universe. If we are led to think about our Universe in terms of Space/time, the concept chosen here of timeless multiverse Cosmos goes beyond and allows to broaden the subject.
The proposed model of Cosmos multiverse with collapse at their end, from universes reduced to the presence of black holes, dispenses from having to choose between two opposing scenarios that are:

- That of a bouncing universe (Gasperini's model or Sitter's space)
- That of an endless inflation from a singularity (hypothesis most commonly retained today)

This reflection aims to bring together in a global model as coherent as possible, theories that seem almost validated but remain difficult to reconcile. The Holy Grail of cosmology, would say the astrophysicist open to new ideas, not without expressing a legitimate doubt about what is partly based on an exercise of thought.
For only a few decades, we have been designing our environment as a mainly event-based space/time where that combines electromagnetic forces, nuclear interactions and the gravitational effects of bodies. In short, a rather hostile environment towards us and which leaves us perplexed about its beginning and its end date. Of course, our vision of the Universe seems to us essentially, able to satisfy our precarious living conditions. Although supported by the expertise of scientists in excellence and the most advanced technical means, the fragmentary representation that we have of our Universe, is it not ultimately rather reductive?

All the phenomena on which we question, could they not be interpreted as the consequence of a chirality between matter and antimatter, these symptomatic constituents of a Universe that makes our tangible reality? Would not many subatomic interactions, incidentally deduced from observations or experiments for some, hide interdependencies putting in discrete osmosis, which can be understood as components of a binary system in quantum symmetry?

We can think that the entropy that characterizes the evolution of our Universe is a «programmed disorder», whose finality will lead to its decrease, although this is not what is said in certain knowledgeable circles. This form of deconstruction of our Universe should end at the end of this spatiotemporal phase shift when matter and antimatter will be able to annihilate in the collapse of the system that binds them.
Relativity means that the topography of the space occupied by ordinary matter are in perpetual change. This disparity of repositories, which makes the dynamics of space/time, would suffice to explain that the time we know, is not necessarily superimposed on antimatter because of spatiotemporal coordinates, which cannot be aggregated. **This form of chirality means that antimatter can only be felt through observable or prescribed phenomena that affect**

our symmetry. Matter and antimatter would interact in a discreet context, hidden by a reality that belongs only to us. The concept of discrete symmetry is not new and several theories have been inspired by it, which however differ on many points. One example is the Janus model by J.P. Petit. They have the merit of reviving the debate by proposing new and interesting bases of reflection but do not seem to seduce scientists as a weakened standard model.
A quantum symmetry involving matter/antimatter interactions engages a mathematical model with inaccessible antimatter variables. From 4 parameters (our space/time), we move to 7 parameters: 3 space parameters for matter, 3 space parameters for antimatter and 1 imaginary time parameter representative of the quantum interactions between matter and antimatter. It is a purely intellectual approach that joins the mathematical model proposed by René Thom to describe predictable or probabilistic interactions but not identifiable because not observable in their real state.

Some scientists attribute to the black hole a vortex effect. In other words, a black hole would be likened to a kind of shortcut that would allow to connect our universe to a parallel universe. The latter could be understood as an anti-Universe with « parallel » quadridimensional properties that make it totally discreet towards us. This is the idea developed here, except that this portal between two universes is somehow a metaphor inviting us to project ourselves into what could be the terminal phase of our Universe. The totality of the energy that made space/time will then be confined within a population of mega-massive black holes (MMBH) in a closed superimposition of states with their symmetry. This prerequisite would lead to the final collapse as proposed in these lines.

The phenomena we observe, would essentially result therefore of discrete process applied to correct this chirality.
What clues do we have to advance such a hypothesis based on the idea of 2 state symmetries without which our Universe would not be?

- The idea of chirality of symmetry between our universe of matter and an antimatter "anti-Universe", allows to elude the hypothesis of a matter-antimatter dissymmetry based on a lack of antimatter resulting from the simple observation that it is not observable. How could the observer that we are, in the environment that is his and that seems to him essentially constituted of matter, recognize the antimatter knowing that it would annihilate in the moment and could lead to its own destruction? If antimatter is neither near nor far from us, it could simply be elsewhere in a dimension in some way parallel, discretely superimposed on the spatiotemporal dimension of matter.

- The presence of matter and antimatter leads to the disintegration of “stationary waves packages” constituting matter particles (see chap. V). The confrontation of particles of matter with those of antimatter, partly returns them to EMW status in open field. Potentially shared between symmetries, these EMW will eventually join one of the countless black holes populating our Universe.
- Einstein’s relativity shows that what we call space-time is a patchwork of entangled repositories. Everything is related to the point that nothing is definable in an absolute way. This disparity of measurement makes everything seem dependent but «shifted from the rest»; a way to approach the idea of significant shifted symmetry of hidden interactions. The relativity supported by the notion of referential is to establish a direct relationship between the speed of propagation of EMW (C) and the low-pressure level of the so-called empty space would result from the concentrational tendency of matter by gravitational effects.

Relativity, inevitably and totally associated with the notion of space/time, tends to show that the mainly cognitive perception that we have at small and large scale of our Universe is not totally credible. We must therefore leave the common sense and try to describe through a more appropriate language and who would like to be detached from any subjective consideration, all these phenomena that make our Universe. This excessively codified language, which is translated into mathematical formulations, also has its limitations. Even with the help of this tool, it seems that we do not have the capacity to get to the bottom of things in the understanding of our Universe and to interpret to their proper value, the mathematical formulations and models that they inspire us.

From the voice of mathematicians in particular, we keep hearing that reality, would be fundamentally mathematical. Yet some symbols, signs used, some so-called imaginary figures do not correspond to anything that is really representative of what makes our reality.
It is true that, up to a certain level of development, mathematics has proved its worth, even if its models are in general subordinated to a limited context which

would often merit expansion. It should also be noted that through increasingly complex manipulations, this tool tends to take away from reality to get lost in the most disconcerting abstract. Thus, the wave function seems to work, but nobody knows the reason and the Schrödinger equation does not offer an accurate description of what has more than 2 particles. Similarly, calculating the elliptical trajectories of several bodies in interactions becomes more complex as there are bodies involved. The calculations are very quickly probabilistic or statistical on the duration. Recall that today, mathematics do not make compatible quantum mechanics and general relativity, while we use them in the same way for both.

The causality principle implies a logical chronology of events. Interactions, correlations, exchanges of properties and more generally everything that makes the evolution of our Universe, are supposed to be connected with each other in one way or another, in a cause-effect relationship. That being said, this apparently unavoidable principle is based on the use of given benchmarks in terms of location (spatial positioning at a time T), movements (displacements, speed), duration (evolution, permanence), space occupation (extent, density), force (amount of interactions). And indeed, any mathematical reasoning that quickly proves indispensable, to remain consistent with our perception of things, can only be based on the exploitation of units of measurement related to these data such as meter, light year, second, the degree of angle, local level of entropy, density or flux intensity. In other words, the use of mathematics is based on the concept of space/time. Therefore, we can ask ourselves how this tool can be applied to a quantum mechanics that seems to ignore the notions of space and time? It is only at a scale that allows considering the atomic and molecular interactions that classical physics takes its rights. And indeed, the mathematical formulation allows to anchor these observed or prescient interactions to the space of general relativity and a non-reversible time. Are we able to get out of a logic of thought as a methodology for processing information that, even if they differentiate us advantageously from other known forms of intelligence, seem to show their limits? The question disturbs because it leads us to doubt a reality that we now know is only a vision dictated by feelings and physical laws tested but that remain of convenience. Indeed, although we cannot dispute its merits, the image that we have of everything that affects our Universe is reductive and by nature deeply subjective. It cannot consider a deeper reality, not directly observable, made of superimposed states, packets of waves, chirality and quantum symmetry. It results from a phenomenon that we do not control, called quantum decoherence which brings us back to a macroscopic view of a state that manages to describe a classical physics within our reach. But the latter proves inoperable to explain the reason for being, the evolution and the foundations of our Universe.

While the mathematical tool has led to many advances leading to the expected practical applications, it is now proving insufficiently efficient, or even unsuitable to address the new issues raised by these recent advances. Stemming from this observation, and rather than taking refuge in denial, we cannot rule out the feeling that our theories on quantum and relativity are to be reinterpreted. Nevertheless, we continue to make progress even if it is done in stages. The discoveries to come will probably come with the deployment of a new type of computing, based on manipulations of a quantum nature. They will also undoubtedly benefit from the development of artificial intelligence. Algorithms, oversized memory capabilities, machine learning innovative logical methods with automatic error correction will then take over. Our ego should suffer, the machine will then be the inevitable extension of a human intelligence not extensible and scientific applications carried out.

We depend on an increasingly elaborate mathematical tool, which we have developed from the observation of an environment which remains misunderstood in its fundamentals. This valuable tool is perfectly suited for many practical and experimental applications. The problem is that it shows its limits on the subatomic scale and does not really seem to lend itself to the analysis of the disproportionately big as to the deepening of a system of Universe in quantum symmetry.

It happens that mathematics in application of physical laws considered as proven, are unsuitable to transcribe phenomena difficult to observe but prescribed by other observations. We then state singularity, quantum uncertainty or indeterminacy with all the ambiguity that underlies the notion of infinitely small or infinitely large. This underlines the incompleteness of this remarkable tool to help understand the phenomena that animate our Universe.

Thus, in a black hole (see chap. IV), although one can at this stage of evolution of matter, hardly speak of Planck units, the ratio between Planck length and Planck time ($\approx 0 / \approx 0$) is supposed to be reduced to 1 or 0. If $1 = 0$ the result cannot relate to something physical and relates to something that can only be virtual. Undoubtedly it was the same at the birth of the Universe where distances and time were not quantifiable. In these two cases, the physical laws expressed in mathematical language by reference to constants such as the speed of light measured today, are inapplicable. Advanced theories such as those of strings, superstring or quanta of space that want to break the deadlock, are unfortunately not completed mathematical demonstrations. They are particularly difficult to interpret and do not provide the expected lighting.

We are both too fundamentally involved and too ontologically trapped in our status for that. But how can we envisage a framework of observation that would encompass all parameters of our Universe and offer a broader context?

In order to try to approach the true nature of our Universe, should we not strip ourselves of our feelings and accept to question knowledge considered today as sufficiently validated? This would potentially open the door to future progress. We have learned in recent decades, to think in a contrived way by soliciting an imaginary sometimes confusing. How else could we have been led to talk about antiparticles, inverted time, space/time relativity, non-locality, quantum entanglement...? We must recognize that in its foundations, our Universe is far from the image it inspires us at first.

Today we accept that the smallest elementary entity of matter cannot be described other than as a space point and is not representative of space occupancy. It does appear that she is not actually travelling in space. But it does by its potentially interactive presence and diversity, what we understand as space in a macroscopic reality that we struggle to reconsider as we change scale. The measurement of time refers to our experience and can be seen as a tracer of causality for phenomena that for the most part do not seem to imply the existence of antimatter. Why then would quantum symmetry interactions would not escape the linear time that is ours? If quantum mechanics cannot then be thought of in space data, it is excluded from any event framework. We face a threshold of scale.

Space could be defined as an energy field where anything is potentially possible. This space is not divisible. The time has no direction in quantum mechanics and knows how to be forgotten. The problem is that we would like to explain the chirality of symmetry in a relation to time and relying on spatiotemporal dimensions. Always this reference to a lived reality from which we cannot extract but which nevertheless allows us to move forward.

Speaking of quantum symmetry thus leads us to imagine a kind of parallel or superimposed dimension in a time that is not the one we know. This imaginary time would integrate this defect of symmetry between particles and antiparticles called chirality here. Perhaps we should introduce the idea of quantum symmetry into a relativity that should be expanded. **This quantum symmetry has however nothing geometric and the matter/antimatter chirality prescribed here, does not involve a plane of symmetry in space or in time. Elementary particles and antiparticles have no physical dimension and do not represent a volume of occupied space. This essentially quantum chirality has nothing to do with the idea of the enantiomorphic superposition of an object, such as the image reflected by a reflective flat surface.**

An antiparticle is potentially and unfailingly associated with any particle. In most nuclear reactions, the antimatter is anticipated to interact with matter. Simply the antimatter does not let itself be observed because of its nature and the absence of a spatiotemporal dimension.

Quantum mechanics sparingly delivers its mysteries. Thus, the quark, an elementary particle at the center of matter, has existence only paired with others within an atomic nucleus. A quark cannot be discerned in isolation, as our observation capability does not give us access to such a level of scale. Unlike the quark, the electron constantly interacting with EMW and ensuring the bonds between atoms, is discovered even if its presence is dependent on the composition of the nucleus and is only a probability de location in a wave system forming the electron cloud of the atom. Thus, certain electroweak interactions (beta-plus decays in particular) leave clues about the emergence of antielectrons that show up as traces in cloud chambers.
Major component of matter, the proton, composite particle made up of quarks, is singular in that it represents a particularly stable «quantum brick», the presence although unobservable of which can sense remarkably within the atomic nucleus. Moreover, a proton is sufficient alone to make the nucleus of the hydrogen atom, the simplest atom which would represent more than 90% of the atoms that make matter throughout the Universe. It is doubtless for this reason that the proton seems not to be able to disintegrate spontaneously and that without proton, built matter could not be realized.

As every quark can be associated with an antiquark, to each proton should be associated its antiproton except to consider that at the level of composite particles, quantum symmetry is not organized in the same way as for elementary particles because of chirality. The antiproton manifests itself "in cover" during certain interactions affecting the composition of the nucleus. This continuity of the proton that can be guessed incidentally, allows its confinement in a sort of vacuum chamber, isolated by magnetic fields. In the same way, by mobilizing a lot of energy, there should be no impossibility to confine emerging antiprotons during certain nuclear reactions. This isolation situation would not violate the quantum symmetry principle. Indeed, the non-local correlation or quantum entanglement ignores time and space, since an elementary particle cannot be defined classically in terms of time and space occupancy in the same way as a composite particle or an atom nucleus.
The quantum entanglement that led to the idea of non-locality is due to the fact that some elementary particles, although not detachable from a global context that makes up space-time, can share without regard for distance, some of their properties as if they were one and the same entity. Becoming inseparable, everything that affects the properties of one immediately changes in the same way the properties of the other.

In quantum entanglement, time is reduced to a change of state and this sharing of properties reveals a before and an after shared without transmission delay between bound particles. But how to reconcile these so-called non-local exchanges with the concept of space-time which implies for any observable or mathematically prescribed event, movements and a duration of transport? That entangled particles exchange information without this information being transferred by movement, seems so counter-intuitive that we are to think that quantum mechanics would be based on randomness and that everything would then come down to a question of scale.

In the change of quantum properties by contact or proximity influence, exchanges result mainly from charge interactions that fall under observable or prescribed processes, involving a certain time considered as significant of a displacement. These local charge interactions could alter the degree of quantum correlation of the particles involved in these close interactions and in the future, on a more general level, restrict non-local exchange capabilities.

It can be assumed that originally all the particles were closely correlated with each other in a common state of shared symmetry. Many elementary particles have remained intrinsically connected since the event (split, division..) who distinguished them without changing their intrinsic properties or for some since the period of radiative entanglement that saw the appearance of the first particles. The universe has thus become increasingly local, in an evolutionary context of space/ time where our non-quantum reality of observer is part. Everything seems to indicate that we live and think in a world, kind of interface through feelings that belongs only to the ephemeral observer that we are. Led to question its raison d'être, it conceals another deeper reality that escapes its view because of its complexity and because of its very nature. Quantum entanglement does not mean that the entangled particles, if they can make abstraction of space by their correlated state, escape or escape the grasp of time as we perceive it. The universe in its evolution composes with space and time, two notions totally inseparable. Space has no meaning without the expression of time and time is a marker of space.

An atom cannot be seen truly because it is smaller than the wavelengths of visible light. However, it is possible to reconstruct its image using a tunnel effect microscope. We can even confine an entire lightweight atom by cooling and isolating it in a cavity without gravitational effects. With heavy atoms the difficulty is growing. Similarly isolating antiatoms would require considerable amounts of energy in relation to their atomic mass.

To claim to isolate an antimolecule, is a challenge especially since nothing says that the antimatter on this scale is configured identical to the matter we know (see symmetry CPT; chap. XXVII).

Antimatter cannot reach of itself and without precondition, matter spontaneously. This is why its presence is so discreet for us, making the phenomena of matter-antimatter annihilation difficult to detect. But how would the chirality of symmetry predicted here, allow to explain more precisely such a reserve?

The chirality in particle physics would be a matter/antimatter imperfectly shared quantum symmetry and due to the very relativity of space/time. Indeed, this relativity means that space and time have not anything absolute. However, particles and antiparticles, as a package of waves not definable in terms of space and time, should not manifest fundamentally chirality. It must then be considered that it is the interactions considered as exchanges of information and these alone that would be the cause of chirality. A slight spatio-temporal dissymmetry, resulting from a «shifted» evolution in the constitution of composite particles and composite

antiparticles as well as during the atomic nucleus combination phase, would mean that conventional nuclear reactions can only convert a tiny fraction of the particles and antiparticles into energy-carrying gamma radiation without mass or charge. Quantum chirality and relativity are closely related as time and space are inseparable. Quantum symmetry becomes part of relativity. Matter constructed by molecular assembly would only be able to annihilate itself with its symmetry after endless exchange processes and gravitational collapses that make the concentrationary evolution of our Universe.

This evolution would be somehow, self-programmed, inevitable, without possible and irreversible alternative. It could be summarized as follows:
Matter gathers under the effect of the 4 so-called fundamental forces to form the most massive stars. These will eventually collapse on themselves (supernova) usually forming a neutron star in which the electrons joining the atomic nuclei, transform protons into neutrons. These neutron stars will eventually collapse, in one way or another, to become black holes. The latter then have no future but to absorb the energy (matter and radiation) within the reach of their irresistible gravitational power.
The elements not retained by the neutron star or the black hole created during such events, will gather to later form new stellar bodies annunciators of future supernovae. It was no doubt, not always the same, especially when our Universe was in its very beginnings with the formation of primordial black holes.

The Universe divests itself of the neutrons thus deconstructed in the heart of the black holes. However, neutrons are necessary components in the evolution of matter. However, some protons, by binding electrons and neutrinos to them through nuclear reactions, will transform into new neutrons, necessary in the evolution of matter. The stability of the atom with these substitution neutrons is thus preserved. But in this game of empty chairs, the population of electrons, neutrinos, protons, neutrons and other composite particles continues to decrease in favor of a population of black holes increasingly massive. In an "empty" space that will end deprived of any other form of energy than MMBH (massive mega black holes), space and time no longer will be having any meaning. We can then hardly imagine any final outcome other than a global collapse of all these MMBH in convergence by recessive depression of so-called empty space. This upside-down Big Bang would mark the end of our Universe.

The hypothesis of Universe with an accelerated expansion from a so-called singular point, cannot normally, even corrected from the relativistic aspect, present a perfect uniformity of energy density. For an imagined Universe of this kind in open expansion, the Minkowski's metric (measurement method supposed to consider the effects of relativity) can be retained only at the reduced scale of a circumscribed space within the limits of the observable. The finality of the Universe then seems unpredictable. To speak of expansion for something without a delimited edge, nor center, «generated» by a multiverse Cosmos of virtual nature, seems inappropriate.

That is quite different in the hypothesis of a Universe apparently but not truly expansionist. In such a Universe «at the end of life», empty of any astral body (except the black holes) and where space is stripped of any remarkable presence of EMW (electromagnetic waves), the temporal disparities, that make relativity, will disappear. In this configuration of non expansionary Universe which we will say is in **retrograde dispersion**, relativity is called to fade more and more.

We equate a continuous expansion discernible from an extended observation scale, with an increase of volume likely to be occupied. But this statement is contrary to the idea that time and space disappear as we approach the quantum world. In the latter, everything becomes a matter of variable fields that mingle without restraint, requiring the abstraction of time and space. At this level of introspection, we realize our limits. Presumably, the illusion of expansion is due to the fact that our ability to understand does not allow us to model by the mathematical tool other than in spatial positioning (particles) and duration (interactions) data. In our reality, the one we are given to observe, the Universe therefore appears to be expanding.

We describe electromagnetic waves in the form of undulations running animating space and marked with ridges and hollows. This is how we imagine the topography of the kinetic energy fields that form the backdrop of our Universe. This way of thinking inspired the idea, which has since been abandoned, of an ether serving both as a support and as a framework for moving electromagnetic forces. It seems instead that this energy environment falsely qualified as vacuum acting as a frame represents the space/time frame required by a reality that does not belong only to the observer in the mathematical representation that he makes of it.

An unmistakable defect in "synchronization", here called chirality, creates this organized disorder that is our Universe, in a form of determinism that we find difficult to grasp. Of course, out of the bag, chaos theory would be the easy answer, but it does not explain anything remotely logical.
Knowing that it is only an image and by detaching itself from a familiar reality that leads to any observation, how can we define this concept of discreet exchanges between two universes of quantum symmetry?

Let us consider a permeable tight weft, woven in 3D to evoke space. Give a spongy, crumpled and moving appearance to this fabric to represent time. Imagine, in superimposition of images, an aspect well visible place and an aspect towards not visible, copy representing its symmetry. Let us now interface in reverse and in reverse, with an interlacing of osmotic and unrecognized interactions. This artifact can be seen as a trading area or a mirror effect. As the shadow waits for the meridian hour to merge with its subject, this process of reunification by discrete interactions between particles and antiparticles, will find its completion in the collapse by coalescence of what was matter (what makes our reality) and antimatter.
This amounts to agreeing that these symmetrical universes have a physical reality only in the potential confrontation but upset of their opposite states.
We can make a parallel with +X and –X which cancel each other out in arithmetic, without excluding totally in this reflection that the result of +X added to –X is different from zero. But we then change the «register», the latent energy of the multiverse Cosmos can only be of a virtual nature.

This aphorism of energy in rupture of symmetry being put down, it must be recognized that our Universe is perceived above all as a «bubble» of energy devoid of measurable dimensions as of symmetry, swarming with waves and particles (at the convenience, it may be said, of the observer) in a time context that is not reversible. This notion of irreversibility leads us to believe that what is done cannot be undone except in exceptional circumstances (particle/antiparticle pair cancellation) in a same reverse process. But why wouldn't it be through some sort of loop mechanism that would bring back to square one, as described later?

For to be coexisting, particles and antiparticles are supposed to be not in total direct interaction. When particles and antiparticles meet, they lose their particularism. Their decay generates gamma radiation with incidentally other short-lived mass particles. It seems that we are unable to observe such

interactions between symmetries, given their evanescence. This idea of quantum symmetry also solves the problem of infinite differences, bringing them back to loop phenomena that may have inspired the theory of strings and that of quantum loop gravitation in an attempt at unification.
The string theory postulates that elementary particles are not dimensionless points, but one-dimensional strings. These strings vibrating at different frequencies would be the cause of gravitational effects not recognized on this scale.
The string theory would give a status to quantum gravity, space becoming a kind of "network" quantum. Exchange of information would then manifest themselves in the form of links weaving an interactive network. From this dynamic would emerge the space-time which would induce the existence of a gravity of electromagnetic nature at the subatomic scale.
The problem is that when attempting to measure gravitational interactions based on quantum physics, equations can produce results that have no physical meaning except by introducing additional dimensions.
Loop quantum gravitation requires that space-time is somehow pixelated as strings in loops forming spin networks. This theory leads us to believe that our universe would be part of an endless cycle marked by big-bang and big-crunch. Does this mean that our Universe would have known a previous state?

The theory of loop quantum gravity predicts that the Universe would eventually contract before expanding and rebound endlessly. In a way, this idea coincides with the idea of a multiverse Cosmos representative of an infinite number of Universes that were born to disappear in an indefinitely renewed cycle.

A binary system of “universes” in quantum symmetry is not a Universe with 6 dimensions of space. In a Universe with more than 3 spatial dimensions, the gravitational force would somehow curl up on itself. The architecture of matter would then have nothing stable.
The rupture of the cosmological Equilibrium holds more of a discrete and phase-shifted superposition of 2 contrary states inseparable. And important element, it makes it possible to explain a supposed and very enigmatic insufficiency of energy and matter (see chap. XIV).

For any observation, we must refer to time and space, relativizing measured distances and duration of events. By its very presence, any observer, whatever he may be and wherever he is, represents a fraction of time and a part of space that serves as an archetype of measure.

Everything that cannot be defined in any way, in terms of space and time has no place in our reality except to make it a fiction out of our imagination like the idea of Cosmos multiverse.

Space/time is not a physical entity but it provides us with an essential framework for analysis. **What would be its raison d'être, in the absence of this matter that does precisely what we are? Without interaction of matter; point of time and without displacement of bodies; point of space.** If any form of matter intended to dematerialize into black holes not representative of space, the concept of space/ time will prove then, to be irrelevant when our Universe has reached the end of its evolution and that no observer will be able to testify.

But how, as a privileged observer in the evolution of life, have we come to make this context of space/time, an essential framework of thought?

A default consensus, taken as a starting premise, would be that the absence of space and time preceded the starting point of our Universe. Space, even the so-called empty space, has no meaning except in relation to its occupation by matter in one form or another, that is, in relation to the presence of elementary particles possessing a mass.

Symmetry is a remarkable property of matter and can take different aspects (matter/antimatter symmetry, charge conjugation symmetry, parity symmetry, time inversion symmetry). Quantum symmetry does not mean here that there is exact correspondence as on either side of an axis. The Big-bang, representative of a cosmological balance, would be tainted by an unrecognized chirality revealing a symmetry without which particles and antiparticles could not have coexisted by perpetuating the matter.

This initial singularity would mark the opening of a temporality inseparable from the notion of space. The energy intensity of the free radiation that then filled space during the Big Bang, has no equivalent in today's Universe. By interacting with each other, these radiations will be at the origin of the first radiative entanglements announcing a quantum symmetry. These high-energy radiations, partly entangled in first particles of matter and antimatter, will give space-time its properties. Radiation of lower energy will be the EMW of the current Universe. This phenomenon, which will mainly mark the very beginning of our Universe, will confer specific properties on the «packets» of waves thus constituted in elementary particles. These new entities will be assimilated to state vectors, dressed with effects of mass, spin, load for some… They will make the non-reducible components or elementary particles at the basis of current physics. If we could go back to this period native to our Universe, we can imagine that space would seem unlimited and the passage of time too fast to be accounting. At this first stage of the development of our Universe, relativity cannot consider the gravitational effects that remain to come.

As we do with the wave/corpuscle duality and by using, for lack of better, terms that are not precisely adequate, we could define the multiverse Cosmos in several ways, depending on the gaze:

- A purely virtual «thought artifact», of «latent» energy, of «unquantifiable» intensity, without physical representation, without mass, without revealed symmetry, not localized (because without occupying space), without interaction (because without relation to time).

- A «concept» taken under the term Cosmological Balance and likely to be described as a continuum of ruptures and reconstitutions of an unrecognized symmetry. These confrontations (Collapses/Big-bangs) without number involving pairs «of Universes» of quantum symmetry have no remarkable physical reality. This is what gives a «virtual» legitimacy to the multiverse Cosmos.

The multiverse Cosmos is not really emptiness, much less nothingness and because it is not occupying space, is not physically comprehensible. It cannot be confused with what we call quantum field or force field and which refer to the energy space that characterizes our Universe. The force fields represent the space where what we consider to be the 3 fundamental forces of interaction in a gravitational context are exerted with more or less intensity and interdependence. The unoccupied emptiness called nothingness is a pure abstraction that has no place in any cosmological model. In summary, the multiverse Cosmos cannot be equated with any kind of support or substrate of the Universe.

This interpretation of the multiverse Cosmos conceals an unobservable, totally virtual entity. This term is often used in the language of scientists by talking particularly about quantum particles capable of changing their status. It responds to the difficulty of locating in space, or of conceiving the volatility of these same particles when they seem to move without borrowing time. What is virtual is not detectable directly and therefore remains presumed but gives their justification to measurable phenomena or potential to become a reality.

The multiverse Cosmos is not concerned with quantum mechanics, nor with classical relativistic physics. In other words: nuclear, electromagnetic and gravitational interactions would be essentially shared exchanges, circumscribed, characteristics of a binary system of universes in quantum symmetry.

It is difficult to conceive of a beginning in the Universe, if one cannot imagine an end for it. More than an endless story, a loop scenario would be quite modelable. Like in mythology; the phoenix condemned to rise from the ashes. But here we need a detonator and also an exceptional loophole (see Chapter VII). The latter could be the destiny of this stellar monster that is a black hole. It has no real colour and in a very distant future would «open a door» somehow on a new binary system of universes.

A few clues help to imagine what a black hole could be even if he does not let himself be introspected:

Let us ask ourselves the question of what could be a region of space that could not be assimilated to an electromagnetic force field. There would probably be no photovoltaic effect, no magnetic excitation, in short no electromagnetic interaction. How to understand this, considering that EMW manifest themselves through vibrations or vacuum distortions without which we would not be able to represent ourselves space. These ripples, which interact with each other and affect matter, constantly change the energy properties of space. They also give meaning to the latter as a force field representative of interactions between charged particles through photon exchanges. **The quantum state of electrons deprived of interactions with EMW, would become unstable, causing the molecules and therefore matter to collapse in a space "vacuum" of electric and magnetic fields. The bodies that would be there, not emitting spectral lines, can only escape our gaze. Electromagnetic, strong, weak nuclear and gravitational forces are no longer remarkable. But would it not be precisely the characteristics of a black hole? This singular body collapsed on itself, does not emit any**

electromagnetic or other signal and does not transmit any information (except those emitted by its accretion disk and a pulsing magnetic field). Space-time is somehow absorbed by the black hole.

The magnetic dipole of an active black hole logically would imply a rotation of it. In any binary system, the more massive the objects, the faster the rotation speed of the star that will result from their fusion, will be accelerated. This is the case with neutron stars when they merge after forming a binary or ternary system (case of certain pulsars). The black holes, like most stellar objects, thus acquire their speed of rotation from the orbital speed of the objects they will have put into orbit before their fusion. The observed rotation of the accretion disc is probably not synchronous with that of the singularity, whose entropy is probably uniformly zero. This would explain that jets of particles emitted on either side of the accretion disc of a black hole (and not from the core of it), gush out in space like waterspouts. The entropy of a black hole comes down to its horizon of events and possibly surface phenomena.

At a certain amount of energy that would somehow "clog up" the accretion disc is projected towards the poles. After an accelerated orbital course, this excess energy is expelled in the form of ionized plasma and radiation. These twisted jets pass through more or less the geomagnetic axis of the black hole determined by his accretion disk. When its visible surface or more precisely its horizon of events is not saturated, it has nothing to reject.

A black hole is like an unfathomable well that inexorably absorbs the Universe that hosts it. The tidal forces are at its peak. All the «information» that have crossed its event horizon, are confused. They will be rebuilt differently through a "second generation" Big Bang (see Chapter VII) consecutive, although not directly related to a phenomenon of extreme violence: the final collapse.
A Big-bang could be considered as the result out of time and space, of the final collapse of a binary system of universes reduced to the state of black holes (and white by analogy) in symmetry. But can we speak of continuity for two events that open and close on the multiverse Cosmos?
We distinguish the stellar black hole, resulting from the disintegration of a massive star, from the super massive black hole which is the extension and is usually at the center of a galaxy of which it gradually phagocyte the contents. But this whole population of black holes should finish in mega massive black holes **(MMBH)** in a cooled Universe; these MMBH do not exist today; they will populate our Universe in its «end of life». However, the presence of

colossal isolated black holes up to millions or billions of times the size of the black hole sitting or not sitting at the center of galaxies, is more than likely. All the difficulty then, is to detect them when they have not accretion disk. Indeed, however homogeneous it may be, the Universe on a certain scale reveals vast areas belonging to the past and already apparently poor of matter but possibly occupied by such singularities. This would explain in part an observed deficiency of matter, the magnifying glass effect cannot in all cases, betray their presence.

The temperature of a black hole would represent absolute zero, significant for no interaction. The black hole has such a deconstructed energy quantity that its content appears be densified to the maximum in the absence of interstitial space. These are two conditions that we know are necessary for superconductivity. On the other hand, nothing is more differentiable, no charge interference can occur because of the disaggregation of electrons, protons, ions and atomic nuclei that made the baryonic and leptonic matter. We should not be able to talk about internal resistivity or internal magnetic field. It is quite different from the horizon of events, this frontier zone where matter deconstructs before joining the black hole, singularity representative of energy in a kind of fundamental state. The absence of any movement at all levels, allows the superposition or the combination of these 2 contrary states (non-conductivity and superconductivity) into a single state that would make the ownership of the only black holes. This singular property of black holes makes no logical sense. But we know that the Universe never ceases to surprise us by confronting us with such apparent contradictions. The electrons forced the intimacy of the «neutronized» protons in a way, before melting into a certain dark and cold homogeneity that is reminiscent of what our Universe could have been just before the Planck wall. All the constituents of what was matter, will then have lost their peculiarities.

A black hole could be understood as a non-separable amount of energy, outside of space/time and in which the void has no place. This way of understanding the black hole makes it, in a way, a quantum object.

This suggests that time has no more influence on the intrinsic properties of the particle than on those of the black hole. Coming out of a black hole would assume a supraluminal velocity such that it would amount to a return to the past and would amount to change the history of the Universe. Such a paradox led us to imagine that we could change universes and pass into another universe with its own history. This would amount to being «teleported» into another binary system of "universes" in opposite symmetry and joins the theory of parallel worlds populated by wormholes. In a context of virtual multiverse Cosmos, this idea seems to be only an image of science-fiction.

Everything leads us to believe that it is not within our reach to penetrate the intimacy of a black hole. It does not seem more conceivable to pierce otherwise than conditionally, the secret of what is hidden deep inside the smallest constituent of matter behind an equivocal appearance sometimes as wave, sometimes as particle, perfectly justified if we accept the idea of entangled wave packets.

Everything seems to oppose a mega-massive lack hole (MMBH) devoid of accretion disc, to this singularity that is the Big-bang or more precisely what precedes the famous «wall» of Planck. This wall marks the occurrence of a representative context of energy in rupture of symmetry, not open, non-locatable and entropic. Our Universe can then manifest itself by generating heat and brightness in reaction to the emerging constitution of an «embryonic» matter. What is developed later suggests that all these TNMs may eventually come together in a confrontation that would mark the collapse of our Universe. *In a setting worthy of David Copperfield, we would see all the black holes of our Universe disappear from the front of the stage, to reappear upside down on the shape of a primordial quantum singularity and Big-bang is a term that is sufficiently pictorial to be represented.*
The big-bang is not only the starting point of a Universe of matter, it would be also that of a mirror universe of antimatter.

The problem concerning a necessary chirality between Universe and Anti-universe will be developed further (see chap. X).
Deprived of hindsight and also due to lack of perspective, we are too narrow in our physiological condition to imagine «reasonably» beyond what our ability to observe to analyze and deduce permits. The ability is based on a form of logic that is difficult to circumvent and that we have built on a perception of things, consistent with our feelings.
Let us try, however, to contravene it by developing, point by point, this reflection in a theory, which would be global, on the foundations of a multiverse Cosmos.

III The Universe guilty of speeding!

(Except to admit a misinterpretation of our physical laws)

A body said at rest is a body whose inertia would not differ from the rest of a circumscribed system of which it would be a part. This is a purely theoretical case for a body that would then be its own and invariable repository. Indeed, as a consequence of relativity, observation cannot ignore what is happening beyond any system under consideration. Moreover, in any system, whatever it is, gravitational forces continuously disturb velocities and trajectories by modifying the inertial mass of the bodies.

However, imagine a particle at rest. It is then accepted that: E=mc2.
This Einstein's famous simplified formula involves:

- that matter (m) and energy (E) are closely related in various forms and substitutable to each other.
- that the speed of light (c) would be a Space-Time constant, a limit that could not be violated by any massive particle, while accepting…
- that flow of the time which makes it possible to measure the changes affecting any form of energy (see chap. XIX and XXX) is, as the occupation of space, devoid of absolute value (see chap. XXV).

The energy (E), what every observer drains and the gravitational effects (m) which affect him, make that everyone has his own notion of time and therefore his own value of (c). The speed of light (c) for invariant whether it is as a displacement/ time ratio, remains nevertheless evolutionary, depending on gravitational contexts, called repositories that do not stop changing.
The speed of light is presumed not to be able to be exceeded by any form of information transmission and exchange. Given as invariant, it remains nevertheless relative insofar as any observer, like any observed event, does not cease to change repository by undergoing the effects of proximity of «a neighbourhood» in the broadest sense. One could say that any repository continues to vary locally because of the process of deconstruction of our Universe in a context of space in continual depression, accompanied by a dilation of time. This speed limit (c) would be suspended (joining in this, the idea of non-locality) in an unrecognized dimension where discrete interactions would occur between particles and antiparticles take place and where our binary system of "universes" in symmetry becomes «frontier» of the multiverse Cosmos.

Can we affirm, in this regard, that the photons evolve in the vacuum taken in the sense of total absence of all things, whereas the absolute vacuum cannot have a place in our Universe? Even in a future cooled Universe consisting almost exclusively of MMBH and excluding any phenomenon of «evaporation» or return to the void of particles by matter, this vacuum of content would not exist. It would be more accurate to speak of energy space in maximum occupancy depression. *In a pictorial way, the universe could compare to a sponge that dries out in the sun. The spongy matter shrivels up while the cells seem gain in volume. These cells represent the depressive space not occupied by matter. The less and less spongy substance represents the matter that keeps densifying. The image does not go beyond that.*
By definition, a space improperly qualified as void, is a field where locally the baryonic matter seems absent. This does not mean that this space, apparently unoccupied, is really empty of everything. In all points of space, radiation and dispersed elementary particles configure the « space vacuum ».

The photons should adopt straight trajectories. And they do it except that these trajectories are impacted by the deformations of space, due to gravitational effects. In our eyes, the EMW are all the more deviated by the presence of a body that is close to them and massive. Their frequencies then increase with the intensity of the gravitational effects of the approaching body, which captures part of the kinetic energy carried by the EMW. This energy transfer contributes to the depression of interstellar space. The speed of light (in theory 300000 km/s in a space supposed to be empty of the influence of matter) is necessarily given for a space not totally empty since it consists of a minimum of energy represented by the cosmic diffuse background. The scattering speed of electromagnetic waves (EMW) seems to vary according to the energy density of the medium. Indeed, the photons seem to move less rapidly in water than in air. Would the speed of photons be potentially unlimited in the absence of any potential interaction with matter? Their speed (ratio between travelled distance and elapsed time) between 2 distant points, seems consider the topology of space. The speed of light is perceived as accelerated in an energy poor environment. In a complete imaginary vacuum, the speed of photons would therefore be theoretically unlimited. Such an imaginary void can also be understood as a way of representing a multiverse Cosmos without dimension, representative of an energy who has no physical presence. One cannot however think that the time is totally stopped for photons because if this were the case, the speed of light would not be limited to 299 792 km/s. This speed of propagation of EMW is due to the fact that they have been in interaction with matter since the dawn of time. However, these interactions involve energy exchanges and more precisely a loss of kinetic energy for photons considered as virtual particles lacking a mass capable of translating such exchanges. Imagine photons in infinite speed, therefore excludes any significant relationship to a time that becomes meaningless. Can we also speak of displacement, because without a measure of time, it is impossible to refer to space? The EMW would be initially a kinetic energy of infinite speed as much as zero by absence of measurable displacement. This primordial energy would be by Big-bang effect, become a vector energy of quantum exchanges. On a scale accessible to our eyes and the physical laws of general relativity, space/ time will become an essential framework for observation and understanding. This scale problem led to the admission that in quantum mechanics the principle of locality or separability was a question of interpretation.

The speed of light considered as a constant, has the consequence of excluding the idea of simultaneity for distant measurements. Einstein's relativity means that whenever we talk about the dilatation of time (in other words the relative slowdown of this one), we talk about the increasing depression of the space not occupied by matter. This space progressively depletes the kinetic energy of EMW who by realizing the «electromagnetic mesh» of mass particles, contribute to the cohesion of matter by balancing charges.

In a body, at the macroscale, the + and – charges compensate each other, the electrons playing for this the binding agents and contributing to charge neutrality. Because of the gravitational effects it generates, any body tends to become an increasingly massive object that, by triggering the phenomenon of nuclear fusion, leads to the formation of brown dwarfs, neutron stars and black holes. This concentration-based evolution of matter results locally in an energetic depression of the fields that make the space said empty.

The spin, which represents the intrinsic kinetic moment of a particle as well as the kinetic moment of a moving body, gives the particle or body in question resistance to any change in displacement. This resistance represents the inertial mass (the gyroscope thus exploits this principle of conservation of the kinetic moment). The gravitational mass of the same value is none other than the expression of the inertial mass applied to massive bodies.

General relativity means that any object determines its own space and time as a function of its inertial mass and accelerations (both positive and negative) experienced in a scalable repository of its own. Gravitational effects are manifested for the distant observer by a distortion of space (relative shortening or contraction of lengths) in relation to a deformation of time (relative slowing or dilatation of durations). However, it is not possible to report subjectivity in the evaluation of time and lengths because the ratio of the units of measure of distance and duration specific to each event or system taken in isolation do not vary when we do not establish a relationship with an event outside the one observed. It is thus that space and time inseparably correlated draw our Universe by giving it a relief in perpetual evolution. This topography described in 4 dimensions (3 for space, 1 for time) is specific to any observer reported to a local repository that it cannot share with another remote observer.
The entire history of our Universe is based on this complex relationship between space and time, which make 2 unremovable notions. A story that could be described as follows:

1. **Considering the kinetic energy,** as a prerequisite for the constitution of matter:
   Its capacity of dispersion in the primordial universe (dispersion does not necessarily mean expansion) announces the speed-light (not luminous, and not measurable at this stage). Without delay, this rate of dispersion of waves will be determined according to the depressive level of wave fields disturbed by the new presence of objects of increasing mass. The rate of propagation of this kinetic energy, which is the component today's, of the electromagnetic force, is contextual. Considered as impassable, this speed shows its limits by the fact that it is impossible to propagate in a totally empty space. Indeed, far from being empty, the interstellar space is configured «as a backdrop» of our Universe with photons overlaying electromagnetic fields interfering with charged particles of matter. In this false empty space, time, by reference to light velocity, is affected by mass effects. The time is then perceived, as more or less stealthy depending on the intensity of local gravitational effects.
   If for the observer that we are, the light sometimes seems to spread less quickly, it is because the environment traversed by the light is different and evolves differently than that of the observer. Thus, in water, the ratio distance travelled/ elapsed time that gives the speed of propagation of light, remains however unchanged even if, in a dispersive environment such as water, the shortest wavelengths appear to propagate less rapidly

than the longest wavelengths. The reason is that the EMW, by interacting with the H2O molecules (particularly with the electrons encountered), do not stop changing course and thus lengthen their route. This phenomenon gives the impression that the light progresses less quickly and loses intensity.
A speed imagined infinite, necessarily excludes any remarkable repository because time and space have then no sense. Disregard space/time refers to the multiverse Cosmos as a concept of latent energy; a clearly virtual form of energy which can only be virtual for the observer we are.

2. **If one considers the potential energy** representative of the matter: Constantly stirred by quantum interactions, fluctuations and incident movements, it generates gravitational effects. Sometimes giving the impression that they are contrary, they modify the energy density of space, slowing down time in the presence of massive singularities, to immobilize it in a Universe imagined «at it end of life». Inertial force, gravitational effects, force interactions make that everything that carries a mass is seen in the inability to reach the speed of light.

The masses in presence model the space-time. EMW have no gravitational power but nevertheless suffer locally the effects of the deformation of the space that makes their diffusion fields. This space context in the form of fields of variable energy density, sets their relative speeds and their directions of movement. The EMW by interfering with detached molecules and free atoms and particles, somehow carry out the ever-changing tissue of the «empty» space. Their speed of propagation, adjusted by the gravitational obstacles that are the bodies approached, finds its limits. To say of the speed of light that it is constant is an acceptable shortcut when one is limited to a short period of time of local news. On the other hand, if we consider that relativity excludes any idea of observable simultaneity due to disparities and fluctuations imparted to the space/time, it becomes problematic to talk about constant over the duration or out of a local context.

In summary :

- **Exposed to gravitational effects, the EMW are inseparable from a time and a space of reference. Their speed finds its limits. Moreover,**

a speed assumed to be infinite would run counter to relativity and would empty time and space of their meaning.

- **The black holes would ignore time and space. No speed or interaction is remarkable, once past the horizon of events (zone of accretion of which the MMBH of a cooled Universe about to collapse should be deprived).**

The event horizon represents an area of deconstruction of matter. This more or less extensive area that marks a border with space/ time is not homogeneous and therefore cannot be assimilated to a spherical surface. Photons and mass particles reach relativistic speeds quickly exceeded, dependent on their initial velocity and the angle of trajectory. Time is supposed to stop, once crossed the horizon of a black hole. Thus, the image of an object approaching the event horizon and which may seem permanently frozen in the eyes of the distant observer, will eventually disappear from his sight.

We could, tell the story of our Universe, in terms of mass considering, however, that the mass of a particle represents more specifically the amount of energy carried by a perennial assembly of primary waves taken here, under the term radiative entanglement (see: Starting point of space/time or Planck wall in chap. V)

Radiative entanglement is a state that suggests that it should be possible experimentally, to confine EMW in a Bose-Einstein condensate. The Bose-Einstein condensate is indeed, a state of matter or under certain extreme conditions of density and temperature in particular, the particles lose their individuality to form an indistinguishable, non-separable whole, like what might look like a giant exotic elementary particle. This amounts to imagining that it would be possible to slow down the speed of light until it stops. But we can also consider that this apparent phenomenon is space/time relativity and that the Bose-Einstein condensate by compressing space, slows down time, giving the impression that the speed of light regresses until it stops. In this experiment, the difficulty lies in the fact that projecting a laser beam on a target representing such a condensate, implies the implementation of a considerable amount of energy and extreme precision in targeting. As a result, this experimental form of radiative entanglement could hardly be prolonged.

The radiative entanglement by giving the status of mass particle to the radiant primitive energy justifies that the Universe is observationally

rather corpuscular and fundamentally rather undulatory. A particle of matter would remain fundamentally and above all a wave system. The mass of an elementary particle is equivalent to the sum of the kinetic energies of the waves thus confined, making the elementary particle a substantially unbreakable entity not representative of occupied space.
That is different for the atom, the molecule, and any stellar body: at these scales, the time and the space account for the exchanges and interactions that make and modify constructed matter.
The mass that we assimilate to the «weight» of an object at the macro scale, represents the combined internal inertia of a complex assembly of wave packets, augmented by the associated binding energy.

Mass is the rendering we have of a chosen amount of data (spin, charge, color, etc.) that make the intrinsic, inseparable and perennial properties of the elementary particle, considered as the non-deductible component of the material. In summary, mass is the indicator of a degree of patent presence associated with the familiar idea of object. That anybody is a wave packet before reduction on our part is fundamentally accurate and is not only a theory. However, this is not considered admissible in our reality which breaks the wave function (Schrödinger equation) and perceives only the massive object, thus justifying the wave/corpuscle duality and the resulting misunderstandings or inconsistencies. Mass is, in fact, understood as a distinctive property intrinsic to fermions. These elementary particles of mass have the property of forming what makes after decoherence (a phenomenon that puts within the reach of an observer what, in a form other than corpuscular, would not be in the domain of the observable), the constructed matter as we perceive it. But mass can just as easily be considered the revealing of a context of exchanges and displacements resulting from interactions between these energy points that are particles. The mass then becomes extrinsic to the particle. This other meaning of what the mass is, leads to predict the existence of discrete fields that would regulate the exchanges and movements and in which the so-called particles of matter would bathe. The Higgs field seems to fit this hypothesis. It is often this way and in a decisive way that we choose when several alternatives are presented to us.

In quantum mechanics, we tend to dismiss from the outset alternatives that may seem incompatible, to remain on more or less arbitrary choices but consistent with a physics that satisfies our observations? The mass seems inseparable from the particle (therefore intrinsic to it) but it is also indicative of a more general context that makes quantum mechanics (which in this case makes mass an extrinsic property to the particle). The idea of mass is decisive in physics. Mass is the unavoidable ingredient, required for the observation of everything and on which physics rests without consideration of scale. Moreover, without this concept of mass, we would not be able to talk about our Universe, nor fantasize about a multiverse Cosmos that does not belong to our reality.

- **A standard model, which challenges.**

  Our standard model would have radiation traveling through space in all directions, be the product of the annihilation of mass particles with antiparticles. That we cannot observe these antiparticles today (except during certain nuclear reactions) would imply that the latter would have been present in smaller quantities in the beginnings of the Universe to leave only a remnant of particles that make the built matter. In other words, an «embryo», concentrate of primordial matter potentially but unevenly sharing opposite quantum numbers, would have preceded any form of radiation. In this conjecture, matter would therefore be at the origin of EMW representative today of the energy of the «vacuum», which makes the space between particles, atoms, molecules and any stellar object. Undoubtedly, the idea of primitive atom proposed by G. Lemaitre or primordial quanta of matter inspired this now controversial model that predicted the first manifestations of our Universe. However, this modeling of the past of our Universe does not allow to go back further and excludes any first explanation in a context that proves reductive.

  Is the amount of matter present in observable space/time stable? If we consider that the energy carried by matter, is ultimately preserved, but unstructured in black holes, singularities not representative of occupied space, this does not seem to be the case. As matter deconstructs, antimatter potentially present in vacuum energy (it manifests itself in nuclear interactions), should evolve similarly. In the end, we would move towards an empty universe of matter where simultaneously, like matter, antimatter in its own dimension, is deconstructed away from our gaze. The chirality that made them stand out, will dissipate with the pause of time and the absence of occupied space. It is under these conditions that the made possible coalescence of what was matter and antimatter will lead to its end, a Universe where space and time will have lost all meaning.

  We could thus consider another way of conceiving a beginning in our Universe by starting not from a nucleus or embryo of primitive matter but

from what represents the energy of the void, this interstitial space between particles of matter. Which we unduly call the vacuum, is made mainly of kinetic energy, the EMW which can only manifest in the presence of particles (and antiparticles) of mass.
This vacuum energy is potentially convertible into particle/antiparticle couples, a consequence of a polarization of the vacuum that induces the idea of quantum symmetry and interfering energy fields between them. That matter can emerge from the void would justify and could be at the origin of a primary phenomenon: a phase of radiative entanglement decisive in the evolution of our Universe. Developed here, as representative of the Planck wall, it would represent the missing but decisive link in the occurrence of primitive particles (and antiparticles) of mass. We then better understand the reason for this inevitable corpuscle-wave duality. Although this apparent duality does not mean that these two states can really be dissociated when moving from classical relativistic physics (see chap. XXIX) to quantum mechanics.
It can therefore be assumed that most of the matter appeared during this insignificant period of radiative entanglement. The particles of matter would then be, the result of a revelation of symmetry by creation of first couples particles-antiparticles from a latent energy without tangible representation for us, that is to say, cannot fit into a spatiotemporal context. We are not able to apprehend this energy devoid of physical property, other than in the form of a virtual concept, taken here under the somewhat evasive term of Cosmos multiverse.
This phase of radiative entanglements would be the starting point of the first quantum interactions in a nascent context of time and space. We give in this way, a meaning that speaks to us, to what we call Big-bang.
Because of their symmetrical properties (more specifically opposite quantum numbers), particles and antiparticles of mass resulting from this phase of radiative entanglements, would have been forced not to share the same “dimensions” of a space/time in which they would interact discreetly. This explains why our reality hides antimatter. Particles and antiparticles nevertheless interact in the context of electroweak interactions with ephemeral and punctual, creation or annihilation of pairs. The unrecognized presence of antimatter that would stay outside our field of observation, would also explain that this is possibly at the source of gravitational effects not understood and which led to imagine the presence of an unknown matter not observable and not detectable as such, called dark matter (see chap. XIV).

It has been proposed that particles and antiparticles created from the «void» (a void which in this case can only be meaningless) would have been separated too quickly and would not have had the opportunity to annihilate in full. If this cannot be excluded, it cannot validate the theory of an inflationary Universe and does not explain the presumed absence of antimatter. Another hypothesis to justify an antimatter deficiency, argues that particles and antiparticles were not produced in equal quantities and therefore relies on an initial lack of symmetry who does not find themselves in the idea that all physical laws seem to be the consequence of symmetries).

We can consider that this period of radiative entanglement without significant duration, marks the opening of an accelerated time to the extreme and which could not have the relationship to the space that we give it today in a relativistic context. Out of the grasp of time, in a space without remarkable gravitational effects, particles and antiparticles would have remained confined in distinct dimensions of a nascent space/time. At this stage, starting point of our Universe that marks the beginning of space/time with the first gravitational effects, intense cosmic radiation is converted into pairs of particles/antiparticles. In doing so, the level of intensity of the unentangled radiation in primitive particles of mass makes the conditions are no longer met for the radiative entanglement phase to persist. This explains the punctual and ephemeral nature of the pair creations that have been observed since.
This way of seeing somewhat counterintuitive, does not have to wonder about the absence of observable antimatter. Moreover, it dispenses with an inflationary theory that induces, while considering the gravitational force of bodies, a change in the scale of space/time. For this it imagines a hypothetical mass particle called inflaton or dark matter and reports an unknown energy called dark energy. This scalar field too easily brought, is a default response to a supposed expansion of the Universe, just as the Higgs field can be considered as an acceptable explanation for lack of better, to mass effects difficult to explain.

- **Phase 1, the Big Bang: a non-event**
  The 3 most common states of matter are the liquid state, the gaseous state, the solid state which allow any kind of intermediate states. It is necessary to add to it the plasma state less within our reach and which presupposes

extreme conditions of pressure and temperature to dissociate the constituent particles of the nucleus and release the electrons from the atom. More exotic, we can also mention the so-called «Bose-Einstein condensate» state in which atoms of different energy, very strongly cooled, behave like waves. But, is it really surprising if we consider that atomic particles are comparable to entangled wave packets? These atoms will go so far as to adopt the same superfluid quantum state and take the appearance of a single giant wave by leaving, for a brief moment, their initial state of fermion. This state obtained at very low temperature, tends to validate the radiative entanglement phase at the origin of the matter.

This first phenomenon remains on the margins of the conjectured history of our Universe and requires us to leave a physics that we would like to be in phase with our reality. Explanation: a fermion could be seen as a condensate of photons confined in what would make think of an optical microcavity (containment chamber made of curved mirrors so that the photons that are introduced to it do not stop bouncing without never being absorbed).

But can we really talk about photons at this stage that opens the Planck era, kinetic energy, without significant wavelength. We evoke a pre-quantum state, cold, without declared symmetry, because the matter did not yet exist and where energy knew no space, no time, and therefore no significant rate of dispersion for us. These original photons thus enclosed would have a coupling so tight that they are unable to dissociate themselves from themselves. Thus, they will rise in first-particles of matter under excessively high temperature conditions. Of these first interactions, will be born the current elementary particles (see development in Chapter XIII with possible involvement of primordial neutrinos). This preamble, as elusive as it is «cataclysmic», would correspond enough to the first moments that marked the aftermath of the Big Bang.

Without the presence of the elementary particles of mass that build matter and without the gravitational effects it induces, what would remain of our Universe? Nothing to give space and time the meaning we give them and no observer would be interested in the question.

If we consider the phase of radiative entanglement as a possible starting point for the formation of all the massive bodies that make up our Universe, how can we reconcile this so-called first phenomenon with an earlier physical

state? In other words, how can a primary cause, whatever it may be (repeated under the term Big-bang to emphasize its suddenness and violence) fit into a broader framework (incorrectly called here Cosmos multiverse) without us being able to conceive of a prior art link. For lack of established causality, the above can only be hypothetical. This absence of continuity in time between a before and an after, led to qualify this mysterious Big-bang as singularity. Is this not a way to recognize that we are ontologically unable to represent the appearance of matter, that is to say the birth of our Universe from an absence of time and space, which we could translate into Nothing who is physical. It seems inconceivable to us that Nothing, understood generally, in the literal sense of Nothingness, can generate something, except to imagine a virtual prior included here under the term of Cosmos multiverse. But it must be considered that this notion of Virtual cannot be assimilated to that of Nothing.
What would precede the Big-bang cannot, therefore, be defined in terms of the spatiotemporal dimension. The Cosmos described here by literary convenience as multiverse, would therefore evoke an earlier state of latent potential energy, without physical representation in the classical sense but which cannot be assimilated to the Void. Purely contextual, it allows to give a frame, a default explanation to the appearance of matter and the opening of a space/ time. Virtual entity totally counterintuitive, the Cosmos multiverse which cannot be defined as a set, infinite, of universes connected to each other, is confined to an exercise of thought on the fringes of a reality that the observer dresses at his convenience. (see chap. XXIX on decoherence).

If the particle as a space point, is not representative of occupied space, the internally speed of photons entangled so in a kind of self-sustaining resonant wave packets, has nothing to do with the light speed of Einstein's space-time. This concept of particle in which emptiness has no place would explain how in the beginnings of our Universe, which today represents partly visible light, became matter but also antimatter by radiative entanglement. The symmetry that excludes the image of creation out of nothing, in the dogmatic sense of the term, is thus established with the appearance of the first particles and antiparticles of matter. Today, the recovery by the matter of EMW that participate in the diffuse fund, continues as part of the electroweak force combined with the gravitational distortions of space/time. The particle taken out of any context likely to interfere on it, would show no temperature, no change of state. This is what will make from a «end of life» Universe reduced to the presence of black and empty holes of EMW, a world uniformly flat and cold. These conditions tend to suggest that the Universe will fade in the same way that it appeared: without significant temperature, without remarkable symmetry, out of any spatiotemporal context.

The primordial kinetic energy, devoid of mass does not generate gravitational effect and time cannot, at this stage, print its mark. By revealing a rupture of symmetry by creation of particles of matter and antimatter, this energy, will open up space and establish time. Kinetic energy, included in this reflection, represents all that is not potential energy (mass energy in any form). Electromagnetic radiation, capable of being relayed and absorbed by matter, gives it kinetic energy in the form of positive or negative acceleration.

- **Phase 2, that of a binary system of universes in quantum symmetry:** The primordial kinetic energy is converted partly, by radiative entanglement into mass energy. Nucleosynthesis and recombination will complete the structuring of matter. The proliferation of increasingly massive bodies tends to empty the space of what we could call «the energy of emptiness» (a vacuum that however has nothing empty).
  The term <u>radiative entanglement</u> used here does not refer to the coupling of distant particles as used under the expression of quantum entanglement. He describes in these lines, the constructive interference of primordial waves leading to a change of state that has no equivalent today, if not when creating pairs without tomorrow. These highly energetic waves, entangled in rather perennial ways, in the form of elementary particles, have in some way created «inextricable knots» and without dimension, of energy. Formed at the dawn of the Universe, in the embryonic state, these mass particles will regroup as heavier and heavier atoms. This would explain that this matter, of which we make a representation, today, in the form of elementary entities grouping together to better interact with each other, remains contrary to any appearance, fundamentally undulatory before being, in our view, structurally corpuscular.

  Time would therefore have "opened up" with the first radiative entanglements. But time is a dimension that has nothing absolute (see chap. XX). It is fortuitous as well as ephemeral. The chirality that characterizes a binary system of "universes" in quantum symmetry, resides in this «not smooth» character of time. Produced by the first radiative entanglements, the potential energy is a carrier of this chirality. Thus, matter and antimatter are realized. A single symmetry to which we are attached is revealed to us. With a lot of imagination, antimatter could be seen as the discreet shadow of matter that makes our reality. Antimatter would be based on its own time, and would be therefore not in phase with ours. This particularity implies a space in some way parallel (or superimposed) to the one to which we are attached and who makes our observation framework.

- **Phase 3, precursor of the final collapse:**
  At this stage the energy is about to lose what makes its mass to join the Multiverse Cosmos. All the kinetic energy carried by the EMW, will end up captured by the black holes. Time will be suspended when, for lack of significant space, the interactions of matter deconstructed and reassembled in this ultimate configuration. Dug to the extreme, the space will then disappear, in the simultaneous collapse of all MMBH, singularities of phase-transition where the principle of exclusion is transgressed.

The acceleration of a body supposedly isolated and imagined at rest, implies an increase in its mass itself revealing an energy supply. For any body to be able to approach the speed of light, it should either bring back to itself all the matter of which the Universe is constituted, or convert its mass energy into kinetic energy. But to deconstruct matter in order to convert it entirely into kinetic energy. This is precisely what would be the destiny of all MMBH in a cooled Universe «at the end of life».

Since EMW have no mass, they do not generate gravitational effects. Although they represent energy in motion, they cannot accelerate or slow down. However, the gravitational effects of approaching bodies alter their energy potential imposing on their displacement the curvature and temporality of the space crossed. By giving a corpuscular aspect to EMW, the idea of photons assimilated to particles/vectors makes it possible to better understand, the role and nature of electromagnetism.

Outside of any energy environment, (non-admissible hypothesis), particles could logically exceed the speed of 300,000 km/s to move at unlimited speed. But this is a purely theoretical case because it would mean leaving space/time and thus rejecting the idea of referential, prescribed by general relativity.

Moreover, in the absence of units of measurement, how can we even speak of displacement for something that has no theoretical reference framework.

We can also say that for photons in potentially unlimited speed, time is as stopped. But to say that time is stopped is to think that somewhere in the Universe, time does not exist. If the photon is only a point in the sense of location but not an object as the smallest constituent element of geometric space, it could not have dimensions. Since it does not occupy space, it is out of time. Because they are devoid of mass, EMW can be considered as frontier energy vectors of a multiverse cosmos without physical reality for us. These properties that make them transparent to time and space, would put them in the ability to intervene in the discrete interactions in our eyes, between quantum symmetries.

In a black hole of unsuspected density and where space has not its place, the speed of light becomes applicable. In a black hole, The EMW what have lost their vector status, are confined to the point that frequencies and wavelengths lose all meaning. This non-occupation of space is a property common to the black hole and the elementary particle except that in a black hole, the matter is deconstructed and any form of radiative entanglement (past phenomenon generating particles) has disappeared. Energy is in a transient state that no longer belongs to our space/time.

All things considered, nothing really seems to distinguish unlimited speed and zero speed, which both assume the absence of a space/time repository. In both cases, time and space have disappeared. This could evoke, somehow in the first case, the primordial cold kinetic energy representative of the Big Bang, before the first radiative entanglements of the Planck Wall and in the second case, the cold potential energy, deconstructed and deprived of any interaction of the MMBH. These will then restore to the multiverse Cosmos a mass-less energy. Everything would therefore be only a writing game in which it is enough to substitute final collapse for original Big-bang.

We live in a non-reusable environment of sound and light, two phenomena of a very different nature.

- The sound is a low-range wave, which moves faster as the particles encountered are less massive and the molecular bonds are stable and strong. Sounds are supposed to be unable to propagate in sidereal space. This is to forget that the so-called «empty» space contains, in unevenly distributed and variously densified quantities, clouds of gas (mainly hydrogen) likely to allow the propagation of sound waves. Recall that these are nothing other than the vibration of molecules in a medium more or less deformable such as air, water, iron…. The intensity of these molecular tremors varies with the temperature and pressure of the surrounding environment. Our Universe thus produces a background noise diffuse in sound frequencies that are for the most part inaudible to us. These sound waves are by nature different from EMW, although some electromagnetic wave frequencies can carry signals (the principle of radio communications) that can be converted into sounds and vice versa. Sounds would therefore be a mechanical form of waves, derived from electromagnetic waves.

- Light in the broad sense is an electromagnetic wave with a whole range of frequencies, of variable intensity and which is not limited to light frequencies. It is an electric field coupled with a magnetic field everywhere present that helps to give space its dimension of occupation. With an unrestricted range, it interacts with the particles encountered. If it seems to be slowing down, it is because of the additional ways imposed on it by the particles of matter encountered (diffraction).
  Unlike sound, the speed of EMW is given invariant: thus, an observer moving in space will not notice any significant variation in the speed of diffusion of the light in which it bathes.
  This speed of propagation is also relativistic: for 2 distant observers who look at each other, assuming that they can communicate in real shared time, the speeds including that of light look different.

Everything suggests that this ratio of distance travelled/elapsed time, which defines the speed of light, is affected by the effects of the “aging” of the Universe. In other words, the increasing depression of space would affect our way of thinking about relativity and thus the speed of light.
The gravitational effects of the bodies remain without effects on the intrinsic properties of the elementary particle which does not occupy a place in space. In fact, it would be the interactions of quantum mechanics that would be at the

origin of the effects of mass by modifying the properties of space/time and inducing relative variations in the speed and trajectory of light rays. Can we say that the corrected light speed of the effects of relativity in time (the Universe is not static), is an immutable constant (distance traveled/ elapsed time)? Could not the speed of light be affected over time in a doubly relativistic way by the general concentrational evolution of matter. «c» then becomes a constant to adjust according to the level of evolutionary depression of the so-called empty space. The speed of light seems to be determined and limited by the presence of massive bodies that interfere with it. This is what general relativity says. But can we exclude that the fluctuations of vacuum energy have no effect on the evolution of what we consider to be an invariant mathematical constant (c = 299 792 km/second).

The idea of repositories makes those 2 observers have however the same measurement of the speed of the light.
This trend, which leads to the decrease of the energy carried by the EMW, would validate the fact that radiation of excessively high frequencies and amplitudes, such as it can hardly remain today, could have been revealed during the Big-bang, leading to the emergence of the first elementary particles by radiative entanglement. The Planck era, which represents this timeless phase of the beginnings of the Universe before any form of interaction, would be the prerequisite for a Universe emanating from a multiverse Cosmos yet without space-time dimension.

In any case, the classical image that we have today, of a Universe born of nothing, communicating only about itself, presumed to have been entirely contained in the singularity of its origin and in accelerated inflation, seems difficultly compatible with that of multiverse Cosmos. It does not really support a standard model that is struggling to evolve.

All that follows, is in this logic of latent forces potentially in opposite symmetry, being accepted that:

- A binary system of "universes" in quantum symmetry that reflects a break in latent symmetry, in what is the Cosmological Equilibrium, has no history with regard to the multiverse Cosmos.
- The Cosmological Balance evokes a potential Energy, that is to say a form of energy empty of event and which has no concrete representation for us but cannot be amalgamated with the idea of absence of content.

Galaxies and apparent expansion: Galaxies come closer by gravitational effect and then merge. Combined with the kinetic impulse in retrograde dispersion that succeeds the Big Bang, the gravitational effects contribute to give the impression of an inflationary space. And indeed, at observation, galaxies and galactic clusters seem to be moving away from each other all the faster as we place them more far away. But if it is a simple optical illusion, how to explain it?

To simplify, 2/3 of the galaxies are spiral galaxies. They represent only 1/4 of the estimated mass of the observable Universe. While the last third, mostly elliptical galaxies, would represent the remaining 3/4 of the global mass.

The spiral galaxies seem to be the most recently formed even if for the most distant, it is only an image of a distant past. They also represent the most active, even if this is no longer the case for the most distant; gas, matter in the diffuse state abound and stars are freshly formed. Their swollen central part presages the future elliptical galaxy amputated of its spiral arms. These elliptical galaxies with an imposing central black hole are in general, populated by cool planets and old stars. They could also be the product of a collision between galaxies of older generations with blunted rotations. Their rotations would then be upset or dulled. We should therefore see more young spiral galaxies in the distant observable in the past of our Universe. Indeed, it is in this past that particularly dense molecular clouds are detected, harbingers of protogalaxies, young spiral galaxies in the making. The oldest galaxies, if they have "emptied" planets, stars and other bodies around them, could take the form of dwarf galaxies hiding a super massive black hole (SMBH) in a residual cloud of gas and dust.

When we look at the Universe in the distance, we see a lengthening of wavelengths perceived as a Doppler effect which could suggest that the escape velocity of the most distant galaxies would be higher than the speed of light. It is to forget that it is the intensity of EMW fields related to gravitational effects that gives its dimension to the space. Difficult therefore to validate this hypothesis of supraluminal velocity except to distort relativity.

This shift of the light prism towards the red could be explained simply by several closely related phenomena that were more marked in the past:

- The budding distant galaxies produced more stars than they do today.
- The current Universe, more populated by white or brown dwarfs, neutron stars and black holes, seems less and less luminous.

- The rotation of the bodies becomes dull with time.
- The electromagnetic radiation they emit tends to the red.
- The density of massive bodies continues to grow stronger by gravitational groupings.
- The formation in the number of young galaxies slows down with, in the nearby observable, a substantially smaller proportion of newly formed galaxies than in the observed past.
- The galaxies observable in the distance, have grown since then and have become, for the most part, colder, elliptical and less active. Unfortunately, their present is out of reach of our instruments. But, all levels of scale combined, we can think that our Universe is and will always be everywhere similar to its observable proximity part and thus globally homogeneous. That the Universe is not the result of a one-off singularity of phenomenal density and insignificant dimension, followed by expansion, but the fact that it was created in a relativistic framework in accordance with what it is today in its global configuration already solves the problem of its homogeneity.

In any case, these two types of galaxies must rub shoulders in the same relationship, throughout the current Universe, marked by the grouping of galaxies and stellar concentrations into galactic clusters. This return to the past of distant galaxies also explains why we noted a lesser amount of constructed matter (see chap. XIV on dark matter) that characterized the younger Universe where the matter was more dispersed and which may give the impression of an accelerated expansion of the Universe.

IV Is our universe riddled with tunnels?
(Tunnels that would cross the history of our Universe)

Would not the whole problem of black holes be in the idea that we have of time inevitably related to our experience and in the somewhat empirical approach that we have of space/time relativity?

If we consider the black hole, as a «state» by destination of the matter produced by the Universe at its beginnings, the density of the matter deconstructed by penetrating into the black hole, would be such that no interaction would be possible there, giving to a distant observer, the impression that time has stopped. In theory, if one were to invert the points of view, the observer we are, seen from the considered black hole, would seem to evolve in an accelerated present to the extreme, consequence and paradox of relativity. The speed of time then becomes a matter of point of view. It is an essential aspect of relativity that must not miss it. They say that time runs in one direction because you cannot go back to the past or the present. The idea of linear time is to be nuanced with general relativity and an «elasticity» of time that excludes the idea of simultaneity in a context of local gravitational fields or repository. As with time, one cannot return to space to its starting point, not even maintain a definite position. Space/time teaches us that we cannot go back in any way and that without displacement, without change of energy level by quantum interactions, without the effects of the intrinsic kinetics of particles, time has no meaning (both literally and figuratively). Moreover, in a black hole, time would not really stop but taking an almost infinite value, gives the impression of no longer flowing.

The density of black holes has been said to be infinite. Is that certain? Can we even speak of compactness for what cannot be likened to a stellar body? If matter is unstructured on its approach, in a at least exotic form that has no equivalent in our physical Universe, the tidal effects of a black hole remain measurable. But curiously, this attractiveness quite similar to gravitational effects, is not related to the size we would like to attribute to the black hole. This would be explained by the fact that the latter is not a star that grows over time but would rather be a singularity (term to speak of what would be outside our space/ time) without significant mass as we understand it to justify interactions in physics, without spin, without electric charge. To put it simply and as its name so well suggests, we could consider it as a hole in space/time

from which we cannot escape and cause that we are led to locate and define it in terms of mass.
This is confirmed by the observation of the most gigantic black holes. These represent only a small part of the black holes populating the observable universe. These phenomenal black holes that appear to us today as they were in a more or less distant past, could be the culmination of so-called primordial black holes, formed at the very beginning of our Universe. Space was then abundant with «clouds» of gases in high concentration, ionized or not (mainly hydrogen). This state of the Universe would have very quickly led to the formation in cascade of stellar bodies of rather modest size. These, given their close proximity, would have merged until reaching a density such that the material thus grouped would have begun to break down to return to a fundamental state, by forming the first black holes. As soon as formed, these small black holes primordial by realizing a kind of local absence of space-time, would not have ceased «to suck» all the surrounding bodies with the proximity gas which then filled the space. These primordial black holes become huge and that the gravitational magnifying glass are far from helping to detect, are rather solitary and discreet. For good reason, the tidal force radius of the black hole is not proportional to its supposed radius. If the gravitational effects of a massive body are inversely proportional to the square of the distance to that body, this does not seem to be the case for the attractive power of a black hole improperly evaluated by equivalent solar mass.

Let us acknowledge that the idea of black hole without mass energy is far from shared. Let us recall, however, that the elementary particle (fermion) that makes matter comes down to a point without physical dimension in space. It is only when observed, related to other particles, that it is perceived as an interacting mass entity in a part of space. So, perhaps, we should consider as proceeding from the same logic, the fact that a black hole would locally erase space and time. But the topology of space/time means that we cannot perceive it as such. For the observer, a black hole is a tangible object. This explains why we have to give it a mass. A black hole would therefore be a breakthrough in our space/time, in other words a window on a Cosmos predicted multiverse. Resulting from an extreme curvature of space, it is in a kind of a local loop out of space/time that goes as far as to close on itself. In a way, a black hole goes back in time by giving deconstructed energy the properties or rather the absence of physical properties that it had before Planck's wall.

We could compare the black holes to a beam of tunnels connecting the beginning and the end of our Universe, with no other way out. Their so-called «gravitational» effects are of a different nature than those of massive bodies which, by finding their origin in electromagnetic interactions (see development chap. XVI), would be quantum phenomena. These ajar portals to space/time will close after they have absorbed what remained of a cooled Universe, emptied of radiation and matter in interactions that make our reality. At this final stage which leads to smooth the effects of space/time relativity, any trace of matter-antimatter chirality will be about to disappear by absence of temporality. The representative energy of antimatter probably does not evolve identical to matter but to remain on the same image, this leads to predict the existence of discrete white holes, open to an antimatter just as discreet (see chap. XI relative to antimatter). Considered in superposition of states, black holes and white holes will then be able to annihilate, restoring «the cosmological balance» broken during the Big-bang.

Mass is nothing more than the degree of resistance of a body (potential energy) to any modification of its movement (kinetic energy). It is also an indicator of the gravitational effects suffered and generated and of any form of acceleration. More gravitational force as more acceleration force modifies the local referential by contracting space and dilating time for any event considered in situ.
"In all my research, I never found any matter. For me, the term matter implies a bundle of energy that is given by an intelligent mind. would have said Max Planck, one of the fathers of quantum mechanics. He was probably not wrong if we consider that past the horizon of events, matter by collapsing on itself, seems to be converted in transient phase, at rest energy. This state, which reflects no interaction, no internal exchange and where time has no meaning, can hardly be interpreted as an effective occupation of space/time. Thus, matter returns to the state of energy without mass. It produces a kind of cold, radiative plasma in an exotic form, without material reality compatible with our observable universe. Could the black hole be of a quantum nature, like the elementary particle, considered here as a packet of entangled waves, without spatial dimensions? Our space/time in its evolution, could then be understood as the contextual framework of a phase transition between the elementary particle, packet of entangled waves initiated during the Big-bang and the black hole liminal singularity to the return of mass energy to the primordial state, heralding the final collapse.

Like the interacting elementary particle, an active black hole does not escape this quantum phenomenon that is the reduction of the wave packet. Attractiveness and presence of an accretion disk make us conjecture some interactions of the black hole with a space/time of which it would remain nevertheless in margin. Also, as it does for the elementary particle observed in interaction and presumed in superposition of states, the observer will attribute to the black hole hidden behind its event horizon, a state corresponding to a known state observable macroscopically. The observer is not able to recognize any other quantum state, the superposition of state in quantum mechanics is not accessible to him. As for the elementary particle, we are reduced, any measure leading to the destruction of the superposition of states (or quantum decoherence), to attribute to the black hole properties that are not representative of its quantum nature as defined by the mathematical concept of wave function. Thus, we have been led to attribute to black holes properties that have the sole merit of making them fit into our standard cosmological model but remain, in large part, subjective and speculative. It is also so recurrent that we have become accustomed to arbitrarily define black holes in number of solar masses.

Thus, it was imagined:

- Massive black holes, rotating and without electric charge (Kerr)
- Massive black holes, without rotation and without load (Schwarzschild)
- Massive black holes, without rotation, with load (Reissner-Nordstrom)
- Extreme black holes with almost no mass, with load, in maximum rotation (Stephen Hawking)
- Massive black holes, rotating, with load (Kerr- Newman)

The model of black hole proposed here, reduced to a wave packet «at rest», without spatial dimension or temporality, has nothing of a massive body, is devoid of intrinsic angular moment and electromagnetic charge. Its attractive force close to the gravitational effects of massive bodies, is due to the fact that the black hole acts as a vacuum pump by gradually stripping space/ time of any form of interaction. This trend will in the sense of a return to a certain cosmological balance representative of the idea of Cosmos multiverse. We could make a parallel with the idea of dark energy (called cosmological constant, in its mathematical concept). With negative pressure, it would be supposed to explain a supposed expansion of space understood as an expansion of our Universe but whose the reality remains totally hypothetical.

Any form of energy crossing the horizon of the events of a black hole, disappears from space/time and has no more temporality. This would explain why in a black hole, past, present and future are confused. The information mixes. the final collapse is already accomplished and but hides itself to our eyes. How to introspect a black hole? The secrets of the Universe seem well out of reach for the observer whose space/ time acts as a prison and relativity weaves the chains. Let us recognize that the dialectic struggles to develop such ideas as counterintuitive as hypothetical and that we are far from being able to validate, anyway.

V About the difficulty in giving purpose to our Universe

(But benchmarks are missing)

Important point and sometime neglected: We have to start from the idea that each galaxy, like any stellar body, can be considered the center of the Universe.

To speak of a central point, in the sense of the middle of the Universe, makes it a unique place that joins the idea of an expanding Universe. Whereas to speak of a center as a point of reference implies that the Universe possesses a multiplicity of centers. The center of the universe is in a way, where the observation point is. There is no privileged positioning.

in the same way, to claim that a Universe presumed without a central point can be in rotation, as might have been imagined, has no really meaning, both literally and figuratively. Indeed, how and in relation to what, define its axis or his plane of rotation? Can we consider that the universe without really turning on itself, hides a faster movement of bodies in periphery? That these movements out of all possible observation, are carried out in the same direction or in shared directions, their trajectories, if they were found to be circular around the same central axis, would induce that the relative space/time in which the evolution of our universe is inscribed, own a centre. This seems to corroborate the idea of an expanding universe, born from a singular point from nowhere. But this is only an assumption reinforced by the illusion of an inflation of space that we would like to place in the framework of space/time relativity. This concept of an expanding universe, turning on itself and developed from a point of infinite energy value is not retained here. It is another way to imagine the ins and outs of our Universe. This is the point developed in these lines and which would give more coherence and relevance to a cosmological model that, although being the subject of a broad consensus, questions and fishing for too many shortcomings.

The given potential energy in mass measurement is generally assessed, related to the conjugated gravitational effects resulting from multiple observations. It is this gravitational force that opposes any trajectory in a straight-line in the Euclidean sense and would prohibit massive objects from leaving our Universe. Although it is a priori not infinite, the Universe we describe here has no edge that is accessible to us. Trajectory and speed of travel do not change this. We can only wander with the fluctuations of these gravitational fields that bend and shape our Universe. We are, in a way, doomed to travel the countless routes drawn by gravity. A rugged itinerary of elevation changes (stars and planets) and potholes (black holes) on winding paths (retrograde dispersal routes) which intersect and alter their paths over time; *it is rather like a labyrinth to the closed itinerary and strewn with scalable obstacles in motion, with no other final outcome than bottomless dungeons: the famous black holes.* **To be more explicit about this notion of unmarked edge, it must be considered that the idea of perimeter implies a content and therefore a container, in the broadest sense, which leads to the view that:**

- **the content of our Universe can only be defined in relation to its symmetry in a context of binary system of "universes" in quantum symmetry.**
- **the multiverse Cosmos is as deep in what makes our Universe as it is representative of an infinite quantity of symmetrical pairs of "universes". It cannot therefore have the value of a container.**
- **Related to this Universe that makes our reality, the multiverse Cosmos would be somehow everywhere and nowhere at once. That is what makes it a virtual entity and forbids any link between universe systems.**

This vision of our Universe is not in contradiction with Einstein's opinion that proposed a spherical space that could also be toric, representing 3 spatial dimensions «enveloped» in this very particulary fourth dimension that is time, this chronological development, representative of a dynamic of all that characterizes matter and more particularly the living. To help us understand such a concept, let us step into a spherical space.
Any closed broken line forms, on a plane without curvature, a geometric figure whose sum of angles depends only on the number of sides. For a triangle: 180°, for a quadrilateral: 2x180°, for a pentagon: 3x180°, for a hexagon: 4x180°, etc. Compared to the surface of a sphere, the sum of the angles formed by a closed broken line, can go up to represent 3 times these measures of angles. At most, the sum of the angles for a triangle with one side representing the equator and the other 2 sides sharing the same half meridian, would be 3 times 180°. This triangle would thus cover a complete hemisphere. The sum of the angles of a quadrilateral would then be 3 times 360° and that of a pentagon of 3 times 540°…. Enough to catch the dizziness.

Let us stick to the example of the triangle. In so-called Euclidean geometry, the sum of the angles of a triangle is 180° and therefore the line which supports the

3 sides once unfolded from their angles, becomes infinite. An infinite right in a finite Universe! This seems contradictory to say the least.
On the other hand, in the «spherical» space, the sum of the angles being in all cases greater than 180°, the unfolded line of its angles takes a geodesic curvature which will lead it to intersect. One can imagine indeed, as many curved lines intersecting on a sphere as possible poles. Of all these curved lines, the parallels and meridians, have the particularity of forming a closed circle. In any case, we go around in circles; there is no accessible endpoint.
This peculiarity of the triangle shows that it is necessary to show an additional imagination to continue this analysis by reasoning not only on a spherical surface but in the framework of a time-correlated space curved and fluctuating.
The theory of the Big-bang leads us to think that the Universe would be spherical except to consider that its edges are neither plotted nor delimited. Indeed, the relativity of space/time (a time that expands and a space that contracts depending on the presence of massive object and the speed of the observer) makes large and small-scale distances blurry, unstable and uncertain. As a result, it becomes difficult to give our Universe one form rather than another. Therefore, how could we assign dimensions (length, volume, surface) as we do for most observed objects even if they appear predominantly spherical? We can no longer write in the duration, the evolution of our Universe from a supposed Big-bang origin to a possible end date, failing to be able to refer to a unit of value of time that would be detachable from a spatial context tending inexorably towards infinity.

That does not mean that the Universe, devoid of «passable» limits, is nevertheless expanding. Einstein has long been resistant to the idea of an inflation of the Universe. In cosmology, the current "doctrine" advocates an accelerated expansion of the Universe. Our standard model is the result of a general but not unanimous scientific consensus. This has always been the case, the logical tendency being to agree with the opinion of the greatest number of people with extensive knowledge on the subject and to ignore what seems marginal. Critical thinking then loses its relevance. That is the problem, because this form of membership, which seems very natural, has often shown that it merely endorses convictions, likely to be called into question for a number of reasons. The evolution of our knowledge of the Universe is thus marked by a long succession of errors and beliefs remained for some to date in the state of hypotheses. It is enough to consult the scientific works published since Newton, one of the first physicists, mathematicians of the modern era. Why should it be otherwise today? This

finding, which indicates inconsistencies or incompatibilities between observations and predictions, is also echoed in a number of current publications which invite us to reflect on new theories.

Energy makes space more than it fills space. The gravitational space helps to imagine a Universe without established dimension and with constant deformations. Its degree of curvature differs in every place. This curvature of space increases with the age of the Universe until it eventually closes on itself during the final collapse. Space cannot be pixelated: Each part of space is variable and therefore cannot serve as a standard unit for the rest, except to accept an inevitable imprecision and the uncertainty that inevitably results from it.

To illustrate this point, our Universe thought in mass ratios and presenting a assumed positive curvature, could be compared to the outer surface of a sphere. The anti-universe of negative curvature would then represent the internal surface of this same sphere. The globe (hypersphere) considered double-sided, would be representative of a binary system of "universes" in symmetry. To remove any curvature (the final collapse will provide for it), is like implode this imaginary globe. The most direct path in our Universe can only be a geodesic trajectory that follows the curvature of space. Universe and "anti-universe" would therefore present spatially, the same curvatures but not actually shared due to recursive chirality in its evolution.

Trigonometry, the axiom of Euclid's parallels, the Pythagoras theorem, for example, are simple rules that adequately describe our environment within its recognized limits. The same cannot be said in a non-flat context where everything seems to become elusive and globally indescribable. All lines appear curved, irregular, evolutionary and the angles are deformed and changing. The use of differential geometry with the notion of curvature then becomes indispensable for an isolated system. Thus, the Lorentz geometry makes it possible to consider the curvature of space in an unequally shared time by transposing phenomena from one repository to another by converting the space-time coordinates. This mathematical approach on how to consider relativity in the measurement of observed phenomena amounts to putting in parallel repositories at a given moment while discarding the idea of simultaneity. The imprecision comes from the fact that nothing is static, everything changes and evolves (speed, mass, displacement). How can the Lorentz transformation consider comprehensively, complex repositories or

interactive contexts that evolve differently in otherwise occupied energy fields? Could a same phenomenon occur in the same way here and elsewhere?
The non-commutative geometry, on the other hand, considers the state of a system more than its relation to time and space. But who can say if the particularly complex formulations that these new disciplines propose, treat fully the effects, at all levels, of a relativity still too recently recognized? Note that some of Einstein's general relativity equations are still not in the state of being fully explained.

The geometry of space-time holds in the distribution of the masses and the fluctuation of energy fields. The notion of point in motion is then replaced by that of quantum state or field and the postulate of parallels of Euclidean geometry is discarded.
This leads to a reconsideration of the concepts of space/time and symmetry and to the adaptation of mathematical tools to process supposedly noncommutative data such as amount of movement and position in quantum mechanics. Such a geometry would like to bring together gravitation, electroweak force and what we understand as strong nuclear force. This redesigned geometry would aim to integrate in the same model, the concept of flexible space, space-time relativity, the notion of non-commutativity related to factor setting priorities and that of chirality which joins the idea that we cannot speak of simultaneity for 2 distant events. On the basis of data expressed in wavelengths for distances and measurements of angles integrating curved surfaces, would it be possible to reconstruct the past evolution in a unified model? Can the very idea of a unified model be puzzled as to its meaning? **The very idea of a unified model may be puzzling as to what it means. Moreover, the representation that we can make of a unified model of the universe is probably not the one to be expected.**
The chirality that taints the matter/antimatter symmetry makes it seem surprising to speak of axis of symmetry or axis of orientation as we do in mathematical language with relative numbers (+ and - by reference to the zero number).
The coalescence of 2 sister particles of opposite symmetry removes their wave packet status to the mass particles concerned. The energy is conserved but returns essentially to the kinetic state of electromagnetic radiation. The balance of energy not recovered by the EMW then transforms into any couple of other particles/antiparticles. The reverse phenomenon leading to the production of particle/antiparticle pairs **(form of short-lived radiative entanglement)** can be achieved under certain conditions from high-energy photons. These cycles

that make and undo, will continue until the absorption of any form of energy by the black holes (and white holes to stay on the same picture). In this irreversible process, particles are likely to change shape. Thus, by annihilating with its antiparticle (positron) an electron can produce a quark/antiquark couple. This means that atomic nuclei and therefore atoms will incidentally «gain weight». This type of interaction contributes to the concentrationary evolution of matter.

What could result in: **particle $^{+}$ + antiparticle $^{-}$ ⇔ EMW + incoming emission couple of other particles**, can hardly be written: **particle $^{+}$ + antiparticle $^{-}$ = 0**. One would come to consider that the number 0 which makes the border between positive and negative data does not have its place in quantum mechanics. It seems that a coherent model explaining the origin, evolution and destiny of our Universe, cannot mathematically appeal to the concept of equality (=) and contain zero value **(0).** Does this mean that we should perhaps abandon the idea that **+a -a = 0** and probably that **ab = ba** (a peculiarity of matrix algebra) or that **a** = $\sqrt{\mathbf{a}^2}$ to try to understand in its hidden dimension a Universe so different from what inspires us our reality? Multidimensional, the matrix algebra leads to such paradoxes. But the results it displays, when they prove to disagree with ordinary algebra, could be interpreted as probabilities. So, since we consider that matter and antimatter are fundamentally correlated but do not cancel each other out as we understand it for 2 digits of opposite sign, do we use the appropriate mathematical language?

In quantum physics, considering the incidental effects of the observer's presence, the order of the measurements taken will influence the final result and thus the observer's interpretation of the phenomenon studied. Unlike classical relativistic physics, the order considered of events seems determining. This would mean that the data being factored in a way by the observer, the result would be subject to a partial and subjective interpretation, making measurements or observable non-commutative (A.B ≠ B.A).

AxB ≠ BxA is an inequality that implies that A and B are values represented as a matrix. Each of these matrix products presupposes priorities in the order in which factors are considered. But in quantum mechanics, reversing the order of events necessarily formulated in terms of movements is tantamount to manipulating the arrow of time. However, in any system, any measure taken has an impact on the one that succeeds it. This mathematical subtlety that inspired the uncertainty principle could be understood as a logic attempt to get the particle, as such, out of time (and space). In all cases, since it is a question of describing or reconciling the interactions between nonrelativistic particles, we cannot fail to refer to time and space. But again, nothing is simple because we are far from grasping mathematically what we could define as retraction loops (when the effects affect the causes, as it often seems to be the case). How to understand time which is or is not according to whether it is an interaction itself or whether the particle is considered outside of any interaction. This is the raison d'être of the Planck constant which we can wonder if it should not tend more towards 0. Moreover, is this constant immutable? For is there anything constant, unchanging, static in what makes our Universe?

A number of constants and physical parameters are the basis of our cosmological model and constitute fundamental reference values in astrophysics.

- The cosmological constant and the Hubble constant are essentially mathematical formulations. They allow to integrate in our cosmological model, a supposed inflationary force whose nature remains unknown and called for lack of better, black energy. This hypothetical black energy which would fill the Universe, remains a mystery all the more since it cannot at first, be assimilated to the energy of the vacuum as defined by the quantum theory of the fields.

- The fine structure constant is a unit-less number that gives the relationship between charge and electromagnetic interaction. This constant has no theoretical basis but it allows to interpret certain observations in quantum mechanics. The problem is that it remains dependent on 2 other constants that go into its formulation: the speed of light and the Planck constant (see below).
- The gravitational constant establishes the ratio of proportionality of masses and distances in gravitational interactions. It refers to measurements in units of mass (kg), length (m) and time (s) that are supposed not to vary from each other. This would imply between them an arbitrary constant of conversion. Hardly validatable!

- Planck units are supposed to give a dimension as minimalist as possible (in terms of mass, length, time) or not deductible (temperature) in the form of theoretically admissible units in an essentially mathematical formulation.

These units show too much disproportionality to integrate into a physics, above all, in search of applications.

- The Planck constant is used to give a size to quanta, making the link between energy and frequency. On the other hand, elementary particles are supposed to have no physical dimension. Do we give this constant the proper meaning?

The speed of light given in km/s suggests that these two units of length and duration are invariable and are therefore transparent to the effects of relativity as to the space/time dynamics of our Universe. This would mean that the concentration cell evolution of any form of energy, by impacting the so-called empty space, would have no effect on the propagation of electromagnetic waves. Is that for sure? General relativity, the theory of gravity, is based on the speed of light as a constant. Any variation in this consistency would imply a significant overhaul of Einstein's theory, potentially leading to a new interpretation of gravity and its effects on the evolution of the universe.
Without calling into question the relativity of space/time, we cannot exclude that the speed of light could have changed and continues to do so, in parallel with the evolution of our Universe. This would then affect our distance measurements for distant objects that we perceive in a past time. The very idea of expansion would have to be reconsidered, questioning the current model of the Big Bang and the possible future of our Universe.
Moreover, nothing says that there can be universal fundamental constants, which would also apply to other universes (multiverse theory)

Are these constants really universal knowing that they are representative of an elaborate physics to describe above all, what makes our reality? Most of these constants or parameters are linked by common factors that are likely to evolve. This means that if one constant has to change, it will not be without impact on the others. But above all, their interpretation is given from an unfinished cosmological model that relies on too many uncertainties, unknowns, assumptions and inconsistencies not to be subject to bail.
What would happen if these supposed constants, which seem to set the very conditions of our universe, changed or had been different? We often hear that our universe would then be different from what it is (which seems obvious) but

also that it would collapse on itself, that it would evolve in chaos or that it could not have existed. Is it so certain?

If the physical constants are considered invariable, it is necessarily within the framework of a chosen global context. But what happens when this context continues to evolve? This is the case of our Universe in which time and distances are locally mismatched. Even for constants without dimensions, saying that they are invariable does not mean that their value is absolute. Recall that the elements considered in the numerical value of these constants refer to standard units of time, mass, length in a given local and current environment. However, except to ignore general relativity, these data that describe the evolution of our Universe, are not absolute.

If we agree with the theory of a multiverse Cosmos as developed in these lines, our Universe is not considered a single model. Also, should we not consider more as variables, those constants that, in the long run, would be likely to vary non-linear, as a result of the evolution of the Universe? Other universes with «constants» and different parameters may evolve differently and may not be necessarily compatible with the presence of observers. But, this idea goes against an anthropic principle proposed by some scientists and by the majority of religions.

These somewhat boring considerations, only mean that our methods of analysis must necessarily evolve and that the tools we have patiently shaped (physics, chemistry, mathematics, etc.) should be refined. Moreover, to be properly understood, the slightest event should lead in the absolute, to trace everything that preceded it. In reality, we are still too enclosed in a present of closeness to project ourselves as it should be in a past and a future which rub shoulders with the infinitely large as well as the infinitely small.
Humanity has known the time of the caves, the age of the iron, then that of the new technologies, followed by the era of the nuclear and the digital. In the knowledge of our Universe, it is to be feared that we are still only in the Stone Age. But all hopes are allowed! Programmed intelligence or artificial intelligence just waiting to take over and… also manipulate the user.

Locate to describe:

How to talk about positioning in an open-ended and constantly changing space? As soon as this is done, all measurements become obsolete except to be almost zero or almost infinite. Also, dividing the space into a multitude of volumes, decreed as small as possible was a good way to break the deadlock by establishing acceptable units of value. Each volume is then assumed to be representative of a minimum amount of energy (the quantum). Below this minimalist unit, nothing is more approachable; it is the hidden dimension or discrete state (see chap. X on discrete interactions) which opens the door to the unknown, in this case the multiverse Cosmos. Renormalization is an accounting trick that goes along with the above and avoids having to face non-significant values (some would say infinite). This process, discussed, amounts in fact to redefining the notion of Universe without edge, assimilating it to a limited Universe from which nothing can be excluded. Renormalization is a relevant artifice of a purely mathematical nature, but whose justification as a physical reality is not established. Certain mathematical subtleties allow us to approach a reality that escapes us a priori. Paul Dirac believed that we can rely on a mathematical approach, even if we have difficulty interpreting it. Indeed, what could be more pragmatic but also more abstract than mathematics. But, trying to reconcile pragmatism and abstraction to excess, could it not make us lose the sense of a reality so difficult to discover? Should we not totally look for new discovery routes like the mountaineer to conquer a summit, even if it means reconsidering what we take for granted?

A pixelation of the space was proposed to give, in particular, a discontinuous structure to the radiations, joining in this the idea of quanta. Photons, virtual particles of electromagnetism, allow us to quantify energy variations perceived otherwise in the form of ripples running through space. If matter was built from the radiation of a primordial Universe, a corpuscular approach allows to describe it as an assembly of irreducible entities. Thus, the fermions, are consecrated elementary particles of matter. This amounts to superimposing the image of a Universe where matter takes precedence over that of a Universe fundamentally made of radiation.

It can be assumed that these are unobservable interactions in a context of symmetry, which make us perceive EMW in the form of energy interferences: it is the **undulatory effect** with alternating emission peaks. The potential of these electromagnetic waves to entangle themselves above a certain level of energy, in the agreed form of particles of matter et their predestination to join

the black holes, so that we also perceive them as quanta: it is the **corpuscular effect** or photons.
This observation duality is not unique to EMW. Physical objects may also exhibit wave properties. Moreover, it is this complementarity wave/corpuscle that has led to spectacular advances in the understanding of phenomena in quantum physics notably.

This observation underlines the interdependence of particle displacement and wave propagation. From the elementary particle to the most massive stellar bodies, everything we represent to the state of matter could without changing its nature, dematerialize. But are we intellectually capable of doing so? Everything then becomes information transfers in the form of interactions of fundamentally electromagnetic fields.

- the orbits and moments of presumed rotations of particles (quarks in interactions grouped within the nucleus, electrons orbiting around the nucleus, any particle considered in any system).
- the movements of atoms assembled into molecules (4 hydrogen atoms linked to a carbon atom to obtain a methane molecule, for example) the assembly of molecules, star and planet systems, galaxies and their clusters…
- The photon flux translated into wave frequencies and which give the amplitude of an electric field associated with a magnetic field.

The path of electrons jumping from one orbit dedicated to another, is not foreign to this wave effect representative of electromagnetism. When an electron after absorbing the energy brought by a photon, breaks free from its atom, it behaves like a diffracted photon. If photons from multiple sources are sent one by one on a screen, they draw fringes of interference that are superimposed with a certain offset (experience of Young's slots). In fact, each photon represents a point of interference of the electromagnetic radiation interacting with a multitude of electrons before interfering with the radiation to which we inevitably subject it by observing it. It thus loses its undulatory character and becomes a corpuscle over the duration of observation. The wave-particle duality suggests that matter as we perceive it on a macroscopic scale, would be fundamentally constituted of interlaced waves. The idea of a mass corpuscle would be for the observer integrated into the system under consideration, an artifice dictated by his cognitive functions, to interpret these wave packets at scales which, for him, have nothing quantum.

It is the same with an electron, any other particle, an atom, a molecule that apart from any observation on our part, would remain fundamentally undulatory in nature. But, surprised in interaction under the fire of the EMW, they show a corpuscular behaviour consistent with our ability and logic of perception of things. **What we take by convention for a particle or an object in space represents above all, bundles of entangled waves. These are involved locally in interactions of charges generating magnetic fields that would be the origin of gravitational effects, insignificant on the atomic scale.** Although this is difficult to conceive, matter would be only an appearance of reality inherent in the condition that any observer is relegated. We see ourselves, made up primarily of matter and our vision of things, necessarily empirical, leads us if we want to understand, to materialize what our senses perceive. This amounts to saying that the particle of matter would be basically a bundle of waves in a superposition of possible states. Only one, physically apprehensive, would be accessible to us in a context of constructed matter that makes our reality.

The electrons would be similar to closed-field stationary wave packets whose shared interactions within the atom are perceived as forming a sort of halo at a good distance from a central point depicting the atomic nucleus. The latter represents a containment space for other stationary wave packets such as quarks. The specificity of these packets of waves entangled in particles lies in the sharing of their properties outside of any temporality. By excluding themselves from what makes the space occupiable, they manage to form stable quantum systems: protons and to a lesser extent neutrons whose « agitations » shared within the atomic nucleus, have a sort of vocation to remain in harmony. These composite particles find their relative permanence because of the presence of electrons which, by modifying their orbits and by adapting their properties, achieve the charge equilibrium of the atom. This charge neutrality results mainly from energy transfer between electrons and EMW. The volatility of the electron explains the variety of the molecules that make the constructed matter.

Basically and originally, atoms and molecules would be amalgams of primary wave packets whose interactions under the fire of EMW, ensure a certain stability to matter. A projection of photons emitted one after the other produces the same interferences as those observed when we replace the photons with fermions (particles of matter). Note that the corpuscular image of the particles does not allow to confer the transformations and mutations of matter, the progressive and apparently continuous character inherent in their deeply undulatory state. This is not a problem in that the mathematical tool lends itself more to the discontinuous and unsmoothed interpretation of any form of energy.

In the phenomenon of radiative entanglement, the primordial wave amplitudes that at this stage do not have any physical development (it is impossible to say whether they are flat or unmeasured) are such that by conjoining, they would have been somewhat «confused» until they become inseparable. They will end up confined wave packets, on the margins of a space/time that they suggest to us by their interactions. The particle of matter becomes a stationary system of «vibrating» waves in self-maintained loops, interfering with each other without discontinuity but also interacting collectively and solidly with open electromagnetic fields and other particles (fermions). In these wave packets that would be the elementary particles, it seems that the polarization of the waves thus confined can only be circular, although one cannot speak of a physical plane or axis of rotation. The spin would be, somehow, the representation that we make of this internal agitation intrinsic to the particle and that cannot be equated with a spatial rotation.
The elementary particle being basically only a packet of waves without space occupancy, is able to penetrate and cross for a part, walls of energy, which cannot be done by molecules assembled into objects. A particle could be compared to a stringed instrument that would never stop vibrating. The harmonic of this instrument (wave packet) would be enriched or depleted when it would be in concert with other instruments (other wave packets) having a different harmonic. In this way, the matter constructed could be compared (it's just a picture) to a philharmonic orchestra rich in instruments of all kinds. But then no doubt it is better not to have too much musical ear.

Curiously, whatever the direction chosen, the farther the galaxies are, the faster they seem to move away. Which would lead to lifting the speed limit given by EMW. But we can also say that it is only an optical effect which would be seen in the same way, for any observation made of any point of space if, as predicted here, the Universe was created in its entirety rather than from a singular point. **Detached from the gaze of the observer and related to its symmetry, the Universe as a whole, in the absence of an external referential, could resemble a singularity by breaking symmetry without significant dimension and therefore without remarkable expansion.**

An image that would illustrate this misleading effect, would be that of a cloud of mist in a clear sky and which thickens in the same volume before being condensed into rain droplets. The small droplets, as they gather together, will form large droplets all the more distant as they collect water molecules. If there were no atmospheric gases, the space occupied by the initial mist would have disappeared in an unchanged volume, that of the cloud before it cooled down. Condensation (a form of densification) will return the occupied space to the sum of raindrops, hail or snowflakes.

Gathering and densification of matter, lengthening of wavelengths that make light (not just visible light) are two related phenomena that are perceived differently depending on that we observe in the distance or in our proximity. In the younger Universe observed in the distance, space is supposed to be in accelerated depression. **This means that in deep space, this evolution unrecognized may be erroneously understood as an expansion of the Universe.**

And effectively, the most distant galaxies seem to be moving faster away than our neighbouring galaxies. This inspired the idea of an accelerating Universe, but this vision of our Universe remains despite everything problematic in many ways.
If we consider the Big Bang as the starting point of a possible expansion of the Universe and without involving the radiative entanglement phase theorized here, the extreme heat that followed the first moments of this singularity, supposes a speed of release of all the primordial energy, particularly high. This speed of diffusion would have decreased since then to become insignificant in the current universe of proximity.
It is a rendering that we find at the observation of the confines of our Universe and which is reproduced in the curve bell-shaped traditionally representing the genesis of our Universe (see illustrated plates).
What we perceive at the observable confines of our Universe is ancient history (although it is necessary to relativize if one considers that the unobservable part, is absolutely not quantifiable). We are talking about a past where time and space were different from those in which we live. The current, real displacement of the most distant galaxies escapes our observation because of their remoteness. Their current rate of dispersal (dispersal does not mean increased occupied space) should be roughly equivalent to that of galaxies near us.

The hypothesis of a Universe that expands also raises the question of its rate of expansion considered as an exponential expansion of space and which would be centered on a presumed «point of ignition» while our Universe would have no center proper. This supposed expansion would be explained by readily by a misinterpretation resulting from a confusion between present and past. **It is the concentrationary evolution of matter by gravitational effects that creates the illusion of a Universe that expands by addition of the convergence/gathering/absorption speeds.** As G. Lemaitre predicted, this evolutionary trend creates the illusion of a flight of galaxies that in no way accounts for their actual movements. This illusion of increasing distances in the observable distance can moreover make us see the distant galaxies, smaller than they are.

In the beginning of the Universe, past the phase of radiative entanglement, matter was not as gathered as today. The gravitational effects were not really marked locally, the referential were little differentiated and the insignificant curvatures of space. Space/time relativity could not be reported at this stage. This makes the distant objects that belong to this period in the evolution of our Universe and whose image reaches us today, seem to move away in a straight line, faster than those closer to the observer. The opposite phenomenon is noticeable in the observation of a massive body of relative proximity, and more remarkably when we follow an object approaching a black hole. This object seems to slow down, the intense gravitational effects of the black hole creating the illusion that for the object in question, time tends to stop unlike objects observed in deep space and therefore in the past of our Universe.

In reality, as the horizon of a black hole approaches, any object accelerates its speed until it is deformed by tidal effects (spaghettisation) losing its properties such as mass, spin, charge... to be no more than latent energy devoid of any form of interaction. Detached from space/time in a Universe from which it comes, its status escapes us forever. We can however reasonably assume that this singularity which seems to represent the terminal phase in the evolution of our Universe, is the preliminary to the final collapse of the latter, deprived of a chirality that included the concepts of time and space and of course, the presence of an observer.

Would we not tend to neglect this aspect of general relativity related to the evolution of our Universe when we think of questioning the past by observing the distant?

The Universe is not static. It reveals a **retrograde dispersion** that implies that it has the same average temperature everywhere, and globally an equal homogeneity. This paradigm dispenses with Einstein's cosmological constant. The question of whether this cosmological constant is positive (Einstein), or negative (string theory) becomes thus irrelevant.

A binary system gathering matter and antimatter is, at its beginning, only virtual energy, without physical property, potentially announcing 2 symmetric states. What remains of this kinetic initial energy today seems to be propagating from multiple sources and radio concentrically. In any case, this is how we represent the EMW. In reality, we perceive only the recognized part of these phenomena. Wouldn't what we describe as ripples in an energy field be constituted for each wave front, with secondary wave fronts formed themselves of tertiary waves and so on? This plunge into the infinitely small joins the idea of a curvature Universe, falsely fractal with a «perimeter» tending towards infinity but a finished «volume».

If it has no traceable edge, our Universe would however have no boundary for electromagnetic waves. Indeed, the EMW are remarkable and have presence in our eyes only to the extent that they interfere with each other by superposition or interact with matter by diffraction, refraction, absorption, dispersion, managing the balance of the charge conflicts. It is the interactions of matter mixed with those of EMW that make space/time and give our Universe its dimension, even if it cannot be quantified in its entirety. Without interaction with matter, without gravitational effects to bend the space and modify the trajectory of diffusion of EMW, they would be brought to put themselves, in a way, on the margin of space/ time. In this case, for want of a gravitational context, they would cease to interfere with each other in a constructive or destructive way, as they do in a curving space. That EMW leave space/time and therefore exclude themselves from our Universe, should be possible. This implies that without charge interactions, their electromagnetic fields would no longer have a reason to manifest. Their kinetic energy would then find its first condition, not undulatory before the Big-bang. Thus, exits from space/time and its gravitational effects, they would return, deserting our universe, to the ground, latent state of virtual energy that defines here the multiverse Cosmos.

The EMW constantly interfering with each other constructively or reductively, frequencies, amplitudes and wavelengths are constantly evolving. A photon

could be seen as a point of interference as such elusive to observation and thus justifying the disturbing duality wave/corpuscle.
All the particles that, assembled, make matter, can be seen as corpuscles (in a way arbitrarily localizable points in space and in the capacity of interactions) or waves (represented by energy flows filling the space and revealing ongoing interactions). What we see, one way or another, is the product of the interferences and intensity or information sharing of what was the purely kinetic energy "revealed" by this out-of-time phenomenon that ignited space/time and called the Big-bang.
Perhaps the collapse of any other binomial of "universes" in quantum symmetry, is it the corollary of this singularity that is the Big-bang that excludes itself from a multiverse Cosmos without revealed symmetry. However, it is difficult to say that one universe succeeds another.
The EMW would be the legacy of the latent energy that defines the multiverse Cosmos. They are, in a way, the prime contractors of the process of evolution of our Universe which could be schedule as follows:

1.═ Big-bang: a singularity understood as a break in the cosmological balance. It reveals a chiral symmetry. The latter is associated with the opening of a non-significant time.
2 ═>> radiative entanglements with decoupling of the primordial radiation, which will become the current electromagnetic radiation with its wavelength wide range. Formation of elementary particles, then composite particles. Opening of space/time.
3 ═>> recombination (grouping of composite particles into atomic nuclei with electron implications, thus giving the atom a neutral charge guaranteeing a certain durability).
4 ═>> primordial and stellar nucleosynthesis (formation of heavy nuclei, densification of matter).
5 ═>> Increasing vacuum of space called vacuum (progressive conversion of kinetic energy into potential mass energy, development of galaxies and gathering in clusters by gravitational effects).
6 ═>> gathering of any form of energy that is confined in supermassive black holes (the Universe is getting colder in the absence of any form of entropy).
7 ═>> final collapse of mega-massive black holes with return to cosmological equilibrium. Energy «reintegrates» the Cosmos multiverse: the space/time which was the configuration of our Universe is no longer.

A peculiarity of quantum mechanics is to produce or occasionally annihilate virtual pairs of particles/antiparticles from a certain level of energy (underlying energy present in the interstitial vacuum not occupied by matter and reduced essentially to the presence of electromagnetic fields).
If the void does not exist as an absence of all things, what is what we call the space void? It seems that this vacuum represents a fluctuating field of energy made up of electromagnetic waves and carrying particles and antiparticles detached (free electrons, neutrinos, composite and dispersed elementary particles). Detached, in the sense that these stealth particles are not able to interact electrically and in a related or lasting way with other particles of the same symmetry. In this void, which we could call quantum, free particles and antiparticles, because they are excluded from the assembled matter for a time, are able to come closer together, appearing to emerge from nothingness. The chirality between matter and antimatter can only be an obstacle to it at the scale of constructed matter: atomic nucleus, atom, molecule..., that they can find a "path" to interfere with each other. This path does not really represent a displacement. Space and time do not have in quantum mechanics for particle/antiparticle interactions, the meaning that we give them when dealing with the macroscopic world (with molecular structure). Particles and antiparticles give the impression of appearing spontaneously, as pairs formed as soon as annihilated. Particles and antiparticles then return partly to the state of EMW with incidentally the production of new particles of lower energy. These fluctuations of the vacuum modify the quantum background of space/time by participating in the decrease of occupation by the matter of the so-called empty space.

In the cosmological model presented here, a certain chirality between symmetries means that theses interactions between particles of opposite symmetry are not, on a large scale, in a position to realize themselves. Those that are, essentially escape our view. After a pre-plotted evolution, although not really predictable, particles and antiparticles would be destined to find themselves confined and deconstructed in a population of massive black holes gathering the totality of the energy that makes our Universe. The final collapse would thus represent the ultimate annihilation by confrontation of what was particles and antiparticles of matter of a space/time in which our reality takes place.
Eddington who considered that The Universe was born of a tiny fluctuation breaking the symmetry of the Cosmos said: "Undifferentiated identity and

nothingness cannot be distinguished from a philosophical point of view". If it is that nothingness finds difficultly its place in this paradigm, this quotation joins the theory taken here, of a multiverse cosmos in latent symmetry, concept of departure and completion of our Universe.

The idea developed in these lines, of a no expansionist Universe, refers to a Universe that overall would be the same everywhere at the same time (however, can we speak of absolute simultaneity without contravening relativity?). Galaxies seem to be moving away from us at an accelerated rate regardless of the direction chosen. But how without contradicting oneself, to claim on the one hand that this would be the case regardless of the position of the observer and to affirm on the other hand that the universe was born of a specific singularity, the starting point of its evolution. Relativity does not explain everything. It is permissible to think that the Universe would be started from a multitude of “points” without giving it a definite volume, nor now, nor any period of its past. How can we imagine an expanding Universe if we consider that it cannot be measurable or quantifiable, for lack of index or unit of measure likely to refer?

It is no wonder that we found in very distant galaxies, observed while they were much younger, traces of carbon in lesser quantities. This chemical element, suitable for life, is the thermonuclear product of massive stars that have exploded, for some, in supernova. Since it could not be manufactured in the first moments of the Universe, this carbon is therefore little present in the young stars that we examine in the most distant past. On the other hand, we easily find this element by observing a past of greater proximity and therefore more recent, provided in spiral galaxies rich of red giants, white dwarfs and neutron stars. This means that the more we look into the distance, the more we turn to a distant past populated by young stars relatively poorer in carbon, with no hope of seeing a distant actuality that, unlike the image received, would be richer from this element.

VI The Universe plays boules

(An unpredictable game on an uncertain terrain)

Each species is constructed itself and developed in symbiosis with a local environment of contact. Darwin's theory of evolution leads man, as a dominant species, to consider himself a major, predestined and unavoidable event in the Universe. But we can also think more simply that the living is nothing else than the product of a mineral, solid, liquid, gaseous environment at a stage of evolution conducive to the emergence of a particular macromolecule, qualified as biological. In these chromosomes carrying genes, will duplicate itself, self-program and will evolve the initially viral in nature information that will develop life. This latter recorded in any cell as a synthetic element at the base of organic chemistry is DNA.

To achieve the more or less perennial architecture of matter, atoms usually share one or more electrons by so-called covalent bond. They can also exert between themselves, an electrical interaction of low intensity, necessary to approach the thermodynamic balance. The hydrogen atom (the most widespread atom in the Universe) has the particularity to bind in a stable way with certain electronegative atoms such as oxygen, nitrogen and fluorine. This hydrogen bond under favourable temperature conditions allows to create intermolecular links between hydrogen and 3 other elements in quantity in the universe. These are oxygen, nitrogen and carbon which has the particularity of allowing a great diversity of molecular bonds. It is precisely these constituents with other elements that are rarer but indispensable to cells such as phosphorus and sulphur that make living organisms. Hydrogen bonds are at the origin of these molecular structures in the form of double helices, DNA. This hydrogen bonding, in particular with oxygen, the water molecule (which accounts for 66% of the human body) would therefore be decisive in the genesis of life.
We cannot say that in a given environment, choices are left to genetics. In this logic, if the advent of the living in planetary evolution is indeed in the order of things with the photosynthesis and the carbon cycle, the destiny of man whatever he does would be traced in advance. It is the radiation born from the Big Bang which, after radiative entanglements and information sharing, have allowed symbiotic formation of first viruses and single-celled host organisms. It is not unreasonable to assume that particular quantum phenomena are the basis of the chemistry of life. This long process led to the presence of man on earth. Unfortunately for us, it is these same radiations which cause a lot of aging in our cells. But it is to be feared that man's worst enemy is in him. His

oversized ego encourages him to want to regulate everything, if necessary, by constraint and to appropriate everything without sharing. Unless it is life itself in its most rudimentary, parasitic form within our organisms; a viral form against which man would one day be powerless to react. A very derisory end for a humanity that since Einstein, more particularly should learn to review its behaviour, by relativizing everything and not only time and space! Without forgetting that our planet does not have, in the Universe, the special status that we lend it and that all the stellar bodies that gravitate together around us are so many swords of Damocles on our heads. There is no lack of scenario that will bring humanity to its end. Whatever the case may be, for each of us, taken individually, the future does not have unfortunately much future.

But how can it be explained that in the vastness and uniformity of the Universe, life could have made its cradle, of planets like the earth? The evolution of the material gives the impression that it becomes more complex to better gather. Thus, punctually and rather marginally, could develop on planets predisposed by their biotope, a biodiversity of which we are part. The hydrogen atom is the basis of organic molecules. This explains why the seabed with the presence of water (H^2O) facilitated the emergence of the first life forms in a rudimentary state and then unicellular. Some of these first organisms left the marine environment by necessity or opportunity for an atmosphere composed today of 21% of oxygen (O^2). The radiations, reduced to the appropriate wavelengths due to the presence of this atmospheric layer, brought to these proto-organisms the energy demanded by their evolution, playing in some way, the role of catalyst. To the reign of the plant thus installed, came superimposed an animal life that did not delay in diversifying and for some species to no longer be satisfied with a strictly vegetable diet. Thus, was built the food chain. Undoubtedly a constant need towards more complexity but also of durability - inevitable evolution of the living - it led a part of this animal population, released from the aquatic environment, to collect from a population of herbivores. The instinctive behavior of these predators will evolve to become more and more aware and reasoned.

The human organism is in the end only an assembly of hydrogen (10%) and oxygen (65%) with a carbon (19%) in strong connection with the first 2 components that make water. In addition, nitrogen (3%) helps promote sustainable covalence between these various components. The man who is at the top of this food chain and distinguishes himself from it by developed cognitive abilities, has reached the present stage of this evolution, to be able to make thoughtful and organized actions. These have the particularity, although insignificant on the scale of the Universe, to go against the almost programmed evolution if not «normal» of the latter. This performance of the living could be interpreted as the finality, the ultimate goal of everything that makes the evolution and why not the raison d'être of our Universe. But let us rest our feet on the ground! Everything shows that life will disappear as it is appeared. It is written in the genesis of our planet: life remains a parenthesis.

By analogy, there would have been, nothing revealing before the Big Bang that augured what is become since our Universe. This rather simplifying rapprochement with the living, is only there to help the understanding of what such a singularity could be, nothing that cannot be explained. The hazard, the inexplicable, the singular are often the easy answer to what cannot be determined.
But above all, to think that our Universe is born of nothing, does not necessarily imply that it succeeds nothingness. This idea echoes the one developed here of an interminable «succession» of binary systems of universes in quantum symmetry, unrelated, circumscribed as ours, although somewhat different in their developments. A more or less marked chirality may suggest a process of deconstruction of these, more or less precipitated.
Before going any further, it is necessary to return to these super massive stellar objects, as impenetrable as the smallest supposed constituents of matter which are the elementary particles and of which they seem represent the ultimate destiny: the black holes. What could lead to the conclusion that they are both the origin of our Universe and its culmination?

The first black holes, so-called primordial, had to build up quickly from the collapse of very dense hydrogen clouds that populated the universe in its early days. We observe them in the distance as they were then, more active and luminous (quasars).
Black holes are created and merged through encounters. They become more massive. If it is not the most spectacular, this phenomenon of merging of black holes, is one of the most accomplished of the Universe. Because of the extreme density of the masses confronted, it modifies locally, in excess, space-time. Of unlimited scope, its effects signal itself to us through a flux of very high energy radiation. Particularly penetrating, these gamma-ray bursts mainly and X-rays travel through space without affecting the matter encountered otherwise than

by generating, mainly and by chain reactions, pairs of electrons and anti-electrons, as well as neutrinos and antineutrinos (see chap. XI).

Difficult to detect and observe, black holes are certainly much more numerous than listed. It can be assumed that in collisions between two galaxies, one of the black holes (if not both) that occupied the center of one of the galaxies, like a number of stellar black holes that populate these same galaxies, are projected into intergalactic space. Their considerable equivalent/mass gives them such inertia that this escape would have nothing exceptional. This is how many super massive black holes, now difficult to detect, were able to free themselves from their host galaxy. If they cannot persist below a minimum mass (limit of Oppenheimer-Volkoff), they can however acquire unsuspected equivalent/mass.

A black hole emits, by itself, no signal that we can receive. It is, however, possible to detect it indirectly, in visible light in particular, by radiation that its accretion disc returns by convection of the surface, as well as of the effects of gravitational lensing. Given the direction of rotation of the accretion zone, this light area is mainly on the approach side for an observer. It constantly varies according to the angles of penetration and the mass of the objects affected by this frontier zone. The image received distorted by the countless gravitational disturbances of space, is therefore difficult to interpret.

It is permissible to imagine the content of a MMBH in a cooled Universe, as monolithic, uniform and devoid of atoms and particles in their original diversity. In a way, a singular body, of frozen appearance, bulimic of energy, without wave frequencies other than those emitted by a vestige of the accretion disc and deprived of these oscillations and other motions inherent to matter. A bit like solidified concrete that replaces a mixture of water, sand, gravel, lime and other additives (although this image is imperfectly appropriate, if only in terms of density and homogeneity). This state, which has no equivalent, could be understood as a kind of radiant plasma, exotic, without significant temperature, frozen in a present without a future.

At an advanced stage in the evolution of our Universe, any phenomenon of «evaporation» or radiation from the accretion disc of a black hole, will stop, marking the end of «Hawking radiation». The MMBH, macroscopic quantum objects, no longer emit thermal radiation because the accretion disk, failing to be fed by the matter, has disappeared. This frontier zone of non-return (we should rather speak of a sphere quite congested on its equator) was the source of emission of these radiations. It marks the limit below which nothing can escape the gravitational appeal of a black hole. But this limit differs according to the angle of approach of the photons. It also varies according to the mass, velocity and angular movement of any particle or stellar body on approach. Without distinguishing, however, the latter from its accretion disk, Hawking radiation from a black hole prescribes the emission of highly energetic radiation (mainly gamma) as well as electrons and positrons. Wouldn't the theory of the evaporation of black holes be a way to interpret the exchanges or discharges of energy, not from the black hole itself but from the accretion zone that makes it remarkable?

The "mantle" bright and strong entropy, is not cold. This explains the radiation from a "fed" black hole. By emissions of gamma radiation and X and by discharges of matter, an active black hole evacuates through its poles, due to a "surface" magnetism, the «too full» of energy.

This subversive interpretation of Stephen Hawking's theory considers the advanced state at a futuristic stage of a cooled Universe and this situation is obviously not that of the Universe that offers itself to our gaze. Principles of equivalence and preservation of information in its diversity are no longer applicable to these dark astres. Matter «digested» and dislocated by the black hole, seems to gain in compactness, in a transient cold state, a sort of compromise between potential energy and primordial plasma, before finally collapsing on itself.

Things are then well-advanced which will would lead to associate, although it is not really a direct link, the general collapse of the MMBH constituting a cooled Universe, to a "second-generation" Big-bang. We stay away from the Hindu thought with its conception of a universe that repeats itself.

The existence of the antimatter is more than theoretically established even if we have a lot of difficulty to represent it to ourselves through rare fugaciously induced or mathematically required antiparticles.

We know that masses annihilation by particle/antiparticle confrontation, produces very high frequency waves. By reverse process, we are able to produce antimatter in minute quantities, with a great deal of energy. We are even able to store it by insulating it from any contact with ordinary matter. Antimatter is thus a reality even though to keep it, for a brief moment, requires to confine it under vacuum in a magnetic field at ultra-low temperature. It is a complex process (CERN) requiring strong superconducting magnets and that does not correspond to a case figure that we can observe truly in the natural state. What has become of the antimatter originally given equally with matter? If it has not disappeared, it can only be hidden in one dimension of space that is its own and in a unrecognized time that is not the relative time that we know. The Dirac-Milne universe in its principle, takes up this idea of an antimatter «out of reach» of ordinary matter but able to annihilate with it. Nothing justifying the hypothetical existence of dark matter or dark energy, the universe of Dirac-Milne with a horizon without edge, is exempt from any significant inflation. We find the idea developed here of binomial of "universes" in quantum symmetry.

How can we explain more precisely this notion of the «borderless» Universe? Perhaps starting from the idea that it is difficult for us to imagine a Universe in the form of a polyhedron, a cylinder, a cone, a torus, a Klein bottle or under any other complex geometric form. Arbitrarily, we exclude a Universe whose edges would show a negative curvature.
The configuration both the simplest and the most consistent with the idea of Universe (whether or not it is expanding) born of a singularity, remains the sphere. We see this geometric figure of perfect symmetry as having a single center and a volume circumscribed by an equally perfect curved area. If the sphere is the object with the lowest area/volume ratio, determine its area or volume as locating its center makes any calculation incomplete or incomplete for two reasons:

- First difficulty: the number ∏ which allows to define the ratio between the radius of a sphere (distance between surface and presumed center) on the one hand and its area (4 ∏ r2) or its volume (4/3 ∏ r3), is an irrational number, transcendent which has an infinite number of decimals (3,141592653589……….).
- Second difficulty: space/time relativity makes the Universe a kind of entity with uncertain contours, while curvature whose content has fluctuations in energy density that make the measurements imprecise.

Imperfect distance measurements, a factor ∏ that whatever the degree of precision sought, does not bring a definitive measurement! Under these conditions, how to position a center equidistant from an insufficiently defined perimeter? And how could this perimeter, being a Universe supposedly without well-defined border, be considered a traceable limit? Could there be a form of sphere with two space/time components (matter and antimatter), relativistic, with multiple centers or not-positionable and without defined edge? This would demonstrate the precariousness and incompleteness of even our most advanced mathematics.

This parallel with the sphere is just another mathematical artifice to transpose to our reality, phenomena that refuse to integrate.

The matter/antimatter symmetry, which concerns elementary particles of the same nature, differs from the electrical charge distribution symmetry attributed to particles of different properties and which confers a certain stability by charge neutrality to the atom. That electrons remain at a good distance from the nucleus, could be explained - if we go to the bottom of things - by the fact that the electron cloud of the atom is susceptible, as we have seen, to be considered not as a flux of particles of matter but as a packet of entangled waves. These cohesive waves are then assimilated to an electrically charged event horizon. Similarly, we can consider that the atomic nucleus realizes an equivalent charged system of fundamentally undulating nature. As energy vectors (see chap. XVIII), the EMW realize the neutrality of charge of the constructed material. There is every reason to believe that the universe is, on the whole, neutral of charge.

Antimatter would be defined as the reverse, the hidden energetic reflection of a «palpable» reality made of this matter that is familiar to us.

The particle perceived as an undivided entity, would be only a wave packet but we can hardly consider it as such. Should we imagine antimatter as a carbon copy of the built matter (molecules, stellar objects, etc.) knowing that the antiparticle, too, is a wave packet whose symmetrical properties are imperfectly symmetrical to those of its sister particle? We make matter a tangible reality as well as a subjective one. This reality belongs to us alone, and we are in fact an incarnation as a living organism. It is a surface reality, an interpretation of what our senses deliver to us in a logic that stems from the learning of knowledge and the satisfaction of needs dictated by an unspeakable precariousness. It is to be feared that we are not able to grasp and understand a more complex reality that escapes our eyes but also our intellect. Obviously, to observe the antimatter built, is not today within our reach.

We know that EMW not captured by matter, do not cease to interfere with each other. In phases, they add up and produce a wave of greater amplitude. In total opposition of phases, the wavelengths harmonize and no emission peak is detectable anymore. Between these two extreme cases, according to their emission and route characteristics, the waves interfere with each other in a more or less constructive or destructive way.
For particles and antiparticles to annihilate under conditions of unprovoked destructive interference, this would imply that the waves confined in packets associated with them:

- are of similar intensity (same field orientation, same amplitude, same frequency)
- propagate in the same field of interaction.
- share a common time imaginary for the observer we are. This last condition will only be completely fulfilled at the stage of final collapse when the MMBH have gathered the totality of the energy that our Universe carries.

Not satisfied, these drastic conditions represent what makes the chirality of symmetry.

The concept of **opposing forces** can impart an observation framework for the transmission and transformation of energy.
This symbolism was born from the idea that energy has no definable material reality. Protean, it becomes difficult to define. However, in an antithetical logic, we could say that energy represents the movements and interactions of everything that helps to give a dimension to a doubly relativistic Space/Time due to quantum symmetry. What would become of space if time did not exist. We then imagine an environment where nothing happens, deprived of what makes the energy, and therefore an impossibility of space. **Revealing a rupture of symmetry, time is the representation related to our symmetry that we have of a certain chirality between quantum symmetries.**

VII The “Risen” Universe

(Not to be taken literally)

Quantum symmetry implies that what is true for matter is true for antimatter. *Wanting to explain what a binary system of “universes” in quantum symmetry, comes to think that one could describe «the anti-universe» in the same way as a paper photograph allows you to imagine your film impressed in negative. It seems too simple.*

In this logic that will be developed about the antimatter (see chapter X), a Universe cools by reducing the energy use of the space. Our Universe in «end of life» which will be reduced to the presence of black holes, will end up in maximum space depression. The black holes then seem considerably distant from each other. It would be true if a space that is not in almost total energy depression, separated them; but this is not the case.

At this final stage, there will be an event out of any spatio-temporal context that will collapse all the MMBH at a point that cannot be located (recall that at this point, the so-called empty space has disappeared and the time has stopped). The multiverse Cosmos thus retaining no memory of these binary systems of “universes” in quantum symmetry (see development in chap. X), it would be pointless to look in the diffuse fund of our universe for traces left by an earlier universe (idea emitted by Roger Penrose). When we observe the cosmic diffuse background, we receive photons that come from the most distant regions but also from nearby regions, mixed with other refractories or diverted by the gravitational deformations of space. Under these circumstances, how to correctly interpret this CMB?

If the Big Bang is defined as a "primordial" singularity, the final collapse would then be a "terminal" singularity. However, a singularity is by definition a unique phenomenon, detached from any previous or announced context. **We could also say that the true and only singularity, It is the universe itself, out of «nowhere» and destined to return.** This scenario that exudes a certain aesthetic has the advantage of simplicity, in a plausible concept of Cosmos multiverse.

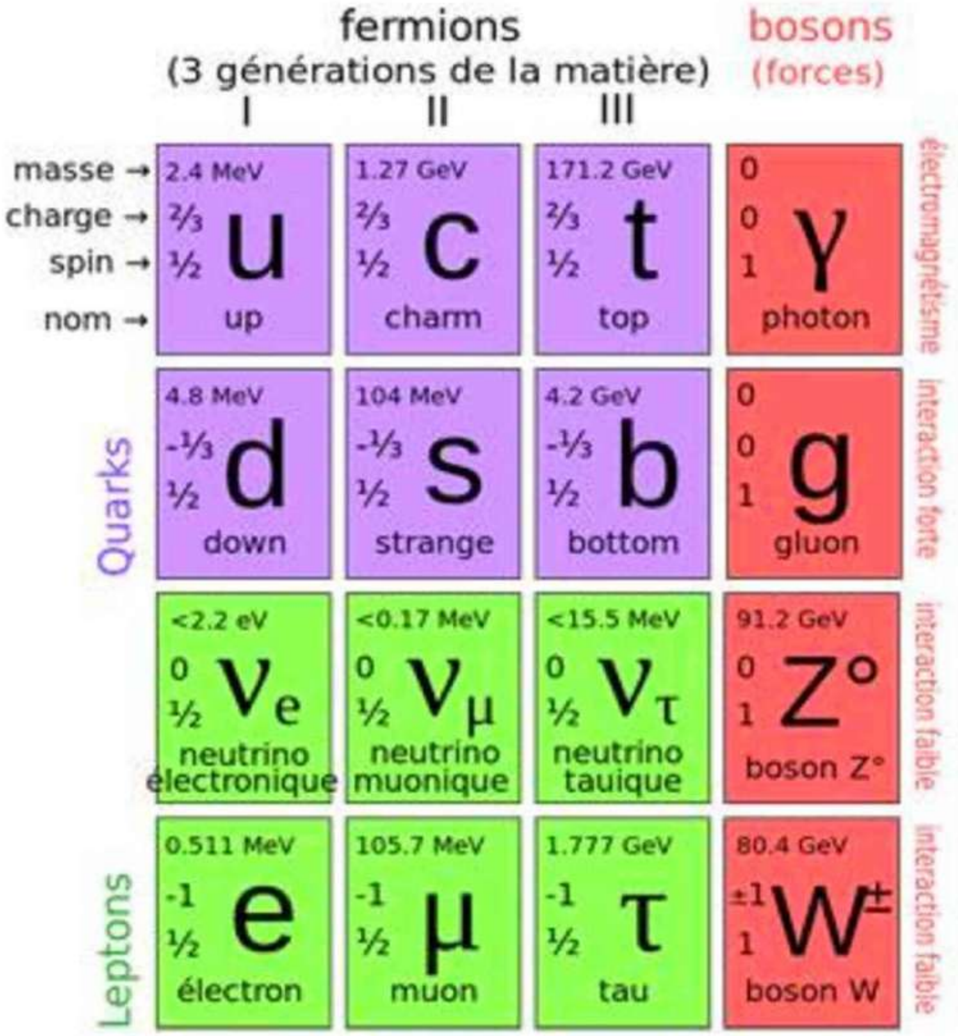
After the “time” of the Big Bang, the intensity was such that the quanta could not distinguish themselves individually. As long as the universe is smooth, we cannot talk about wavelengths (see chap. XXII) and no particle yet. Time remains to come.

Without delay, with the first radiative entanglements, the new matter despoils the diffuse kinetic radiation (now EMW) from part of its intensity. It is in a Universe that loses in continuity, that the idea of corpuscular photon finds its justification. What is undulatory has no precise spatial coordinates. We speak then of an energy field difficult to describe in terms of space occupation. On the other hand, a particle is supposed to represent one-point on the move in space. To speak of a trajectory being a particle is to combine the notion of time with that of space. Corpuscle-wave duality is therefore necessary in the sense that it allows a better understanding of the concept of space/time in a mathematical representation of our Universe.
Frequencies continue to decrease (the highest frequencies have mostly disappeared with the completion of the radiation entanglement phase) and continue to lose intensity (by division, when a photon splits into several photons).

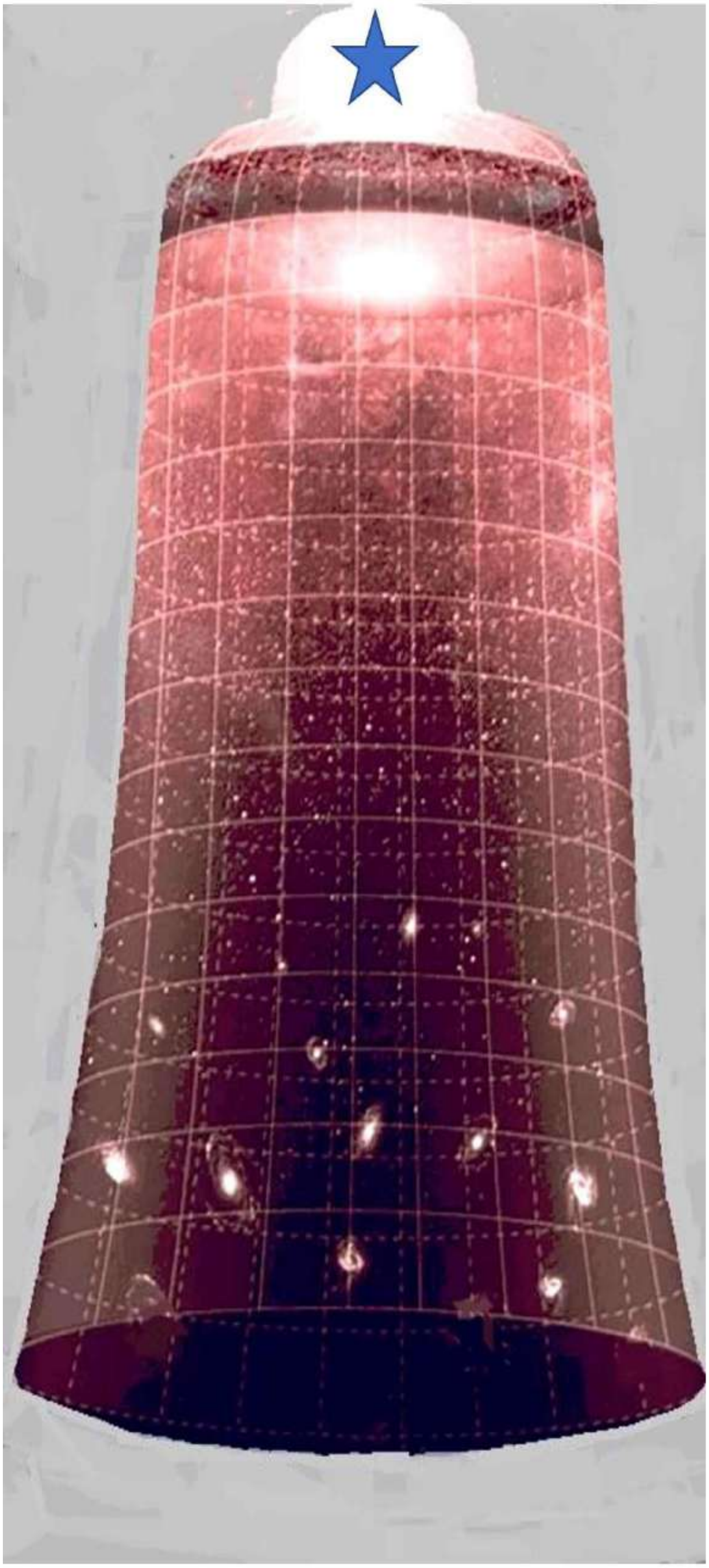
In a cooled Universe, the energy carried by photons, less disturbed in their movements by energy fields now less «congested», have lost in frequency and amplitude. The corpuscular vision that we had, is no longer really appropriate. If one can nevertheless remain on the idea of waves, the lengths of these are stretched to the point of becoming, insignificant. The energy relief of empty space is fading.

The illustrations that follow would like to represent in image the ideas included in the text but are not really transposable as they are.

Standard model elementary particle table

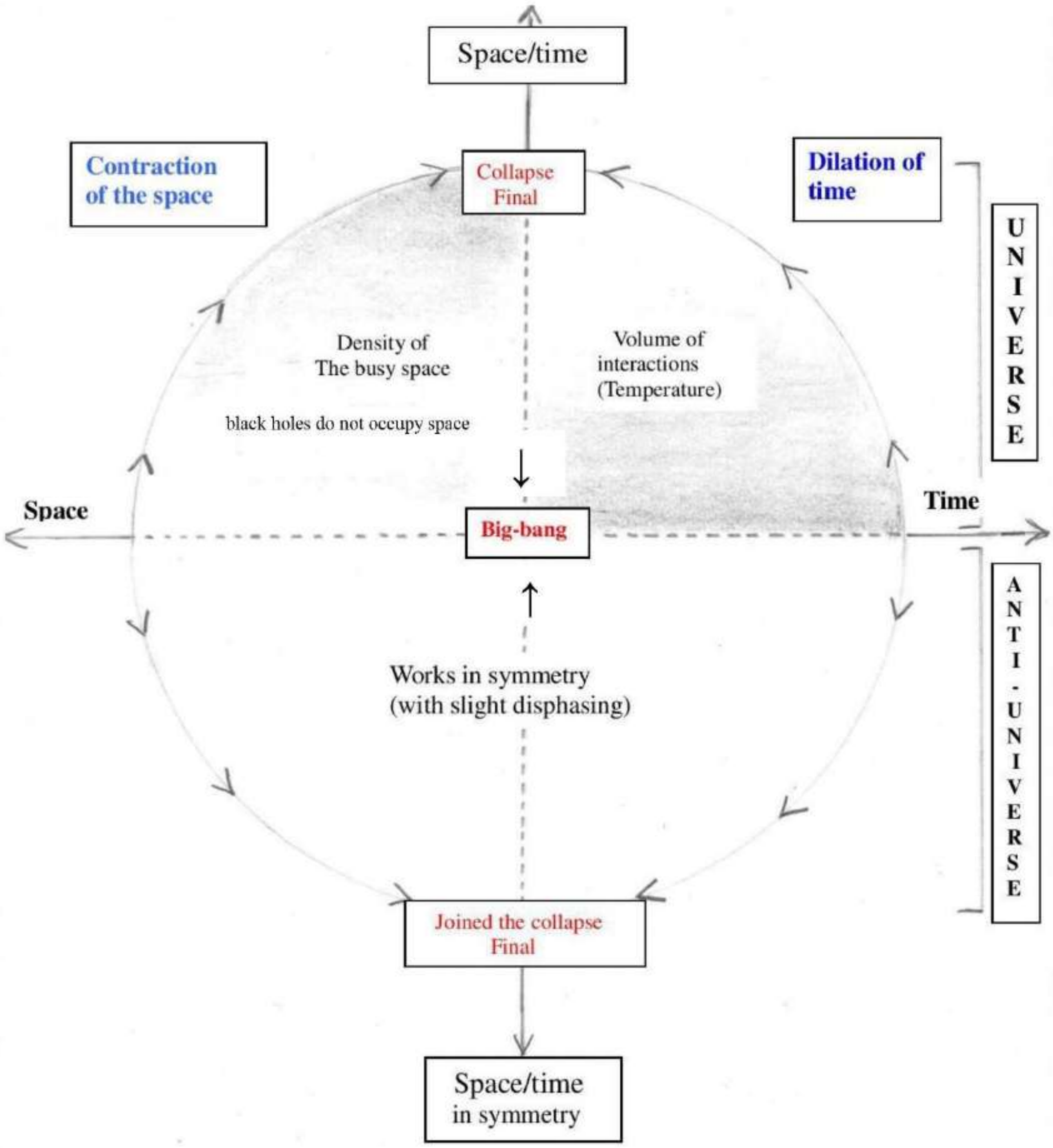


2



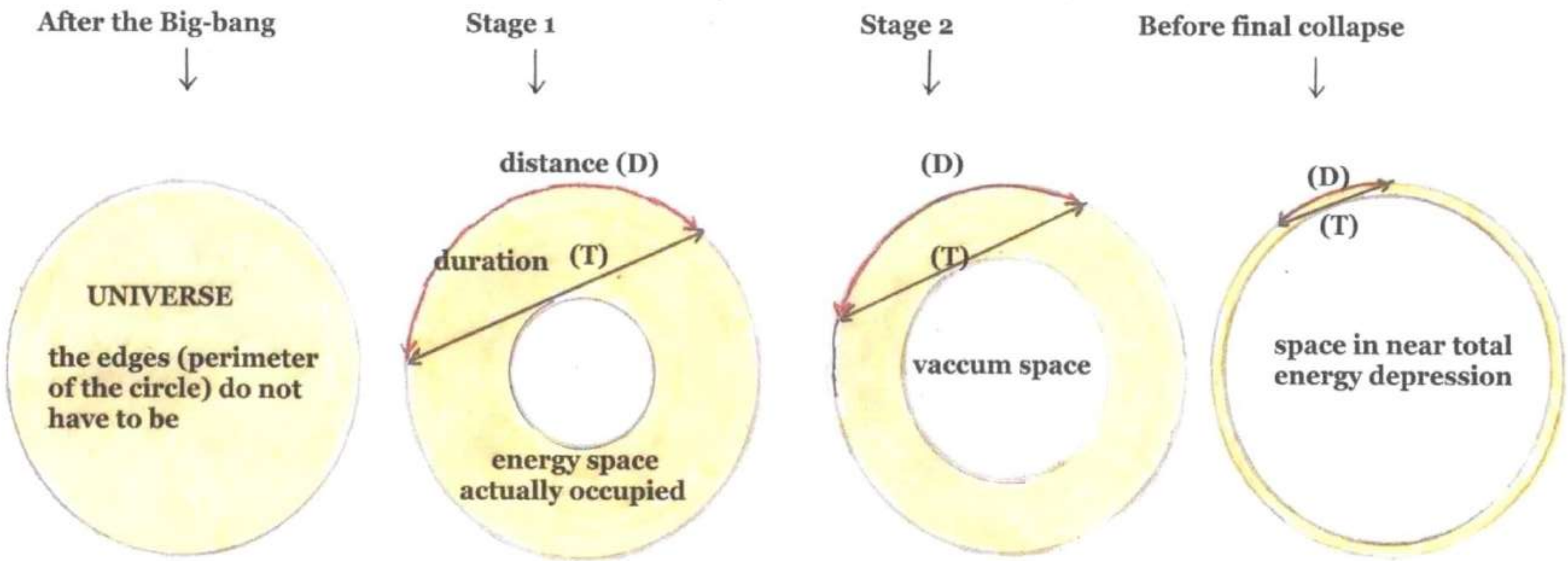
BIG-BANG
↓
First elementary particles
↓
First composite particles
↓
First nuclei, nuclear interactions
↓
First atoms, electromagnetic interactions, gravitation
↓
Formation of the first stars
Formation of the first galaxies
↓
↓
Matter gradually strips the universe of a diffuse radiation
↓
↓
Grouping matter into neutron stars and black holes
↓
↓
↓
↓
↓
↓
↓
↓
↓
formation of the Sun
↓
formation of the Earth
↓
Presence of man on Earth

Representation in accordance with the standard model of the possible evolution of an imagined expanding universe



Fluctuations in symmetry of the space /time in accordance with the selected theory

←←←←	← Multiverse Cosmos (**Cosmological balance**). →	→→→
↓ other Space/ time	↓ Big-bang = (**Break in cosmological balance)** Primordial energy is kinetic, matter does not yet exist	↓ other Space/ time
↓	↓ Left symmetry (**Our universe**). ↓ Right symmetry (The antimatter in a parallel "dimension")	↓
↓	↓ **Opening up space-time** ↓ In each symmetry, a process of entanglement of high energies (radiative entanglement) creates the first retrograde dispersion particles and antiparticles	↓
↓	↓ ↓ A space of «ordinary» matter… differs from A space of antimatter Our relative time … does not match in imaginary time in symmetry ↓ ← Chirality and discrete interactions → ↓ A deconstruction process begins for a return to cosmological balance Kinetic energy in dispersion interacts with matter It also interacts with an unobservable antimatter due to chirality	
↓	↓ Only so-called elementary particles, whose movement and interactions remain	↓
I	permit a relative stability of the alternative potential energy crée par intrication radiative ↓ Kinetic energy is gradually transformed into mass energy	**I**
D	(Consequence of nuclear, electromagnetic and gravitational interactions). ↓ ↓	**D**
E	Massive mega black holes Massive "white" holes ↓ ↓	**E**
M	With the interruption of time (absence of interaction) all chirality disappears	**M**
↓	↓ the coalescence of symmetries by superposition erases the empty space ↓	↓
←	← MMBH and MMWH collapse: **return to cosmological balance** →	→



D/T does not vary, making c (radiation propagation rate) a constant

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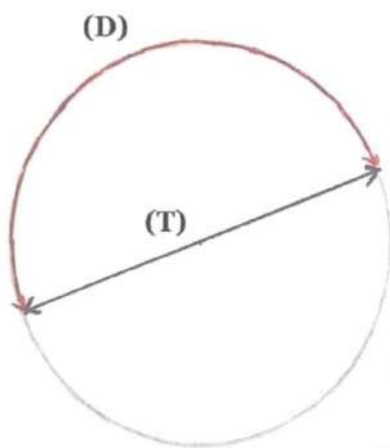


(D/T at the origin of the Universe, as we could represent it in a distant imaginary, vestge of the past

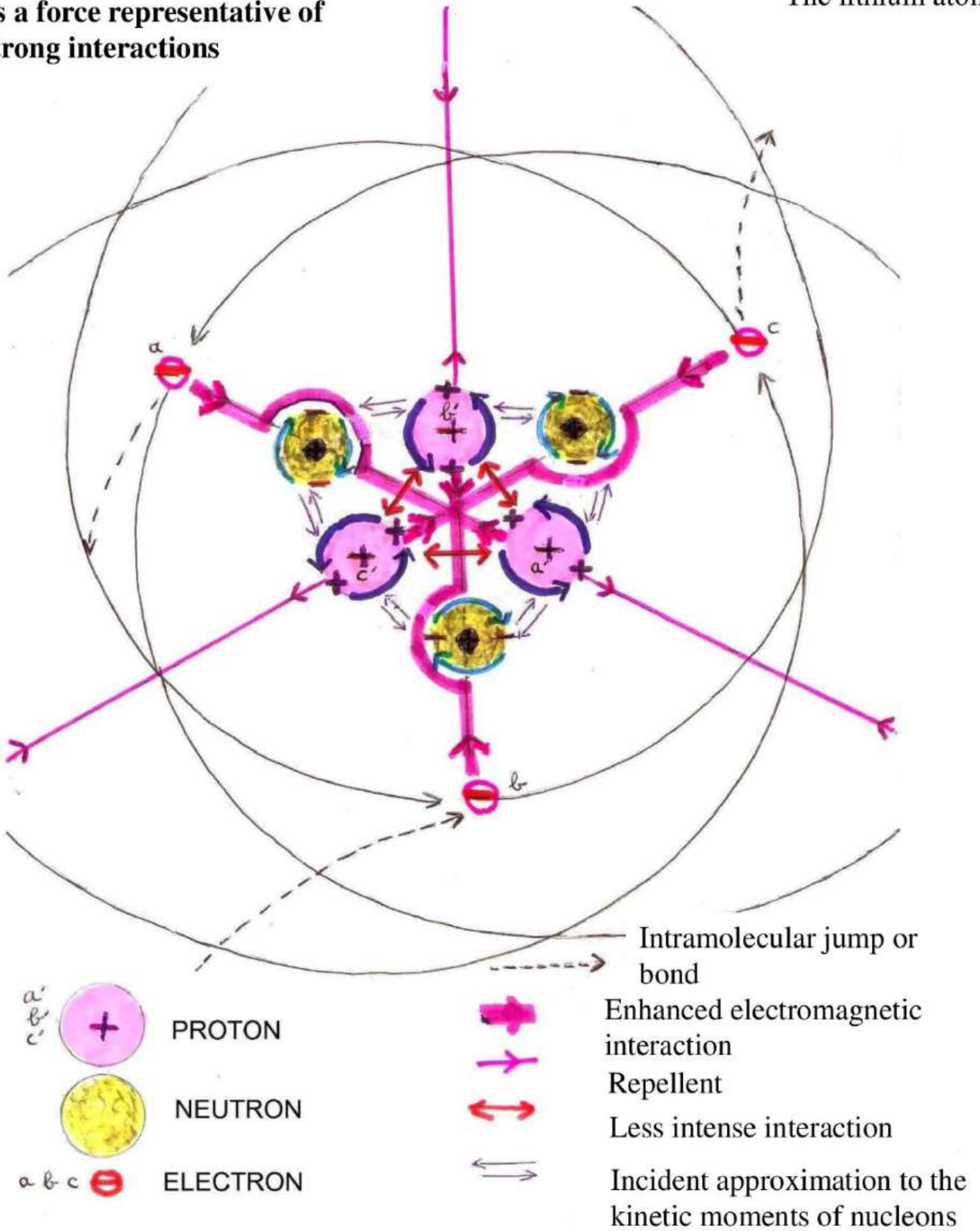
N.B.: black holes are not supposed to occupy space
The Universe is not a sphere. Occupied space and depressed space make only one

In any observation, the image of the distant which is also that of the past, distorts the distances. It is this optical effect that we interpret as an inflation of the Universe

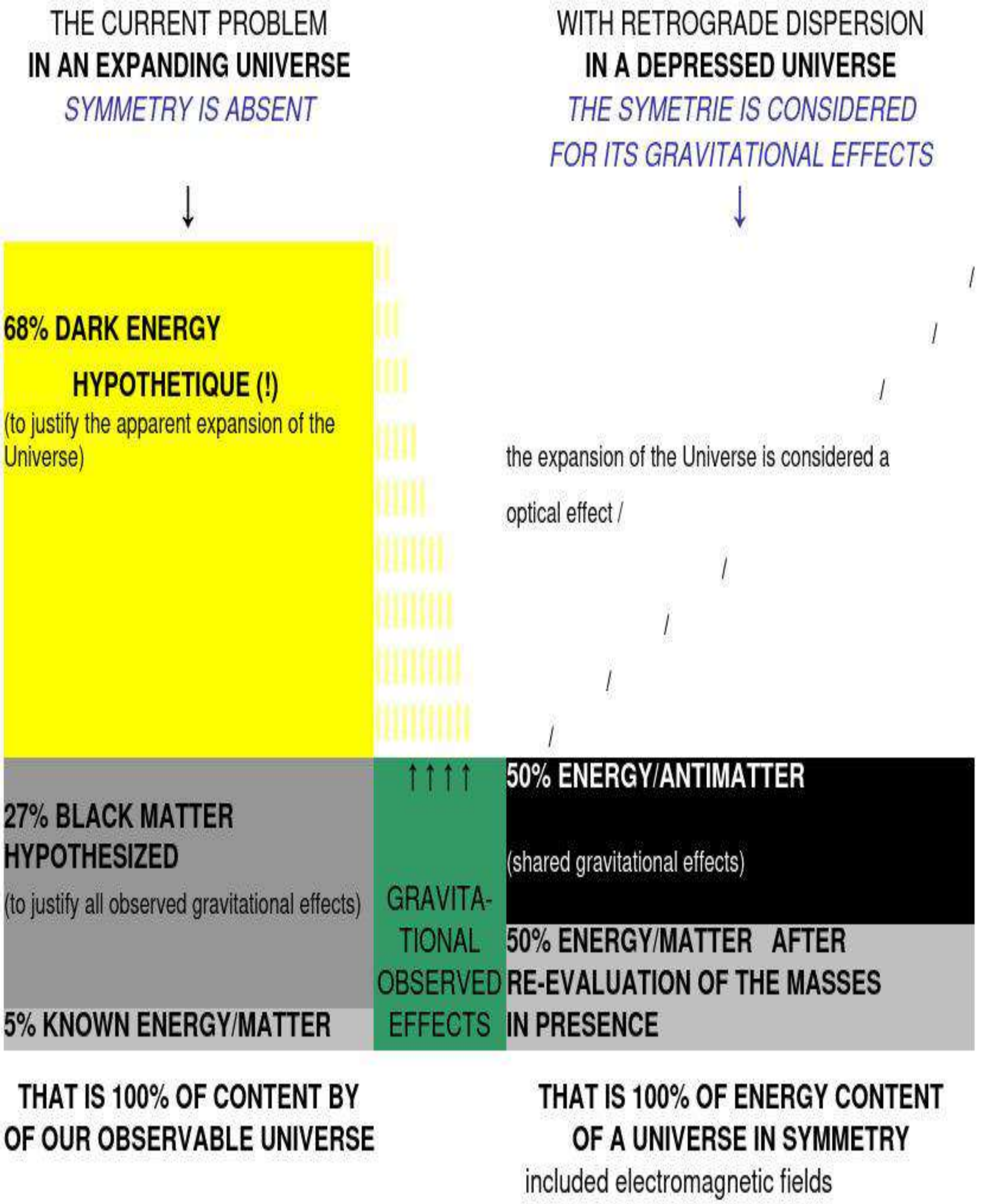
Time, Space and Relativity

Electromagnetic interactions as a force representative of strong interactions

The lithium atom



SPACE/TIME AND SYMMETRY OF UNIVERSE



VIII A singularity that would have nothing singular

(And who, out of time, would conjugate in the plural)

What is energy and how to describe it other than through the observed phenomena, that is to say any movement, any mutation or any variation of temperature that makes it manifest to our eyes?
At any level, any manifestation of energy is supposed to register in a process of return to cosmological balance. Everything that does not tend towards the restoration of this balance broken during the Big-bang, whether on the scale of the particle or that of the galactic clusters, is excluded from the realm of the possible. That is where the weak force occurs.
It is established that energy (E) can be quantified as follows, knowing that it can be shown in different states:

- If particles have mass (we consider mainly the energy carried by the fermions):
  $E = mc^2 + K$
  - m = resting mass (theoretical inert mass of a presumed body without displacement)
  - c = rate of EMW propagation
  - K = kinetic energy representing any variation of motion in relation to a given reference frame
- If mass not revealed (we mainly consider the energy transported by electromagnetic waves and which contribute to ensuring the structural bonds of matter)
  $E = hf$ (h =Planck constant and f = wave frequency)

In the first case, for potential of mass energy, the constant is the high photon velocity (≈ 299792 km/s) squared.
In the second case, more arbitrarily but wisely chosen, the constant is given by the formula of Planck (±6.63 x 10-34 j/s). The Planck constant is supposed to represent a certain observed relationship between the wave frequency and the energy carried by the same wave. It induces that the energy of a particle cannot be measured below a certain threshold thus defined.
Nevertheless, we can ask ourselves whether the constants f and c could not vary significantly over time (see chap. XVIII).
These two equations mean that a mass, representative of a given quantity of energy, can be translated in terms of wave frequencies by reference to the Planck constant. **This equivalence would validate the idea of particles considered as the product of radiative entanglements.**

$M \times c^2 = h \times f$ makes sense only by referring to a contextual environment of space (km traveled) and time (seconds elapsed). Space/time is an essential analytical framework for the observer we are. Describing in time without reference to space seems impossible and vice versa. This explains why we are not able to describe an antimatter that does not share the time that is ours and occupies a dimension of space somewhat parallel.

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To return to Einstein's famous formula, E= mc2 and without wanting to engage further in the field of mathematics, how to explain that the photon, particle without mass, is nevertheless vector carrier of energy. In fact, this equation thus formulated, responds to the particular case of a mass particle considered at rest, without movement, that is to say, out of any gravitational and displacement reference. This case is purely theoretical.
In fact, $E=mc^2$ is a simplified formula of equation $E^2=m^2c^4+p^2c^2$ in which:

E: is the energy carried by the particle or body
M: is the mass at rest or intrinsic mass when the amount of motion (p) is assumed to equal 0.
c: is the speed of light.
p: is the amount of motion held by any particle.
For a particle without mass (m = 0), which is the case of photons representative of EMW, we would obtain with the simplified form:
$E = 0xc^2$ or E = 0 whereas starting from the general formula we obtain:
$E^2=0xc^4+p^2c^2$ is **E=pc** (p is supposed to represent the oscillations of electric and magnetic fields perpendicular to each other).
This result is consistent with the idea that the energy of the photons, in other words of the EMW, lies in their only speed of propagation, translated into frequency and amplitude of waves. The EMW thus provide additional kinetic energy to matter particles, without transport of matter. The energy/mass of these varies with the intrinsic motion thus conferred on them. If the photon represents a unit of energy measurement associated with EMW, the mass particle as a bundle of entangled waves can be understood as a concentration of potential photons confined in a form of contact unification or circular polarization in a closed structure. The mass particle would have the particularity of not being more representative of occupied space than a point which by definition has no dimension. In other words, intrinsic mass could be defined as the level of radiative entanglement characterizing any particle of matter (see wave packet in chap. V).

An observed particle reveals a state reduced to the only properties that an observer is able to more or less assume before measurement. These properties, which are actually prescribed by the choice of measurement tools and modalities of observation, fall within a reductive view peculiar to the observer. This is called wave packet reduction. It leads in a reductive but logical way to define the particle or any observed system, in terms of mass, electric charge, spin, color, etc.

It must also be considered that some of these properties, which are also closely correlated and interdependent, cannot be attributed to certain types of particles. Indeed, photons have no mass, neutrinos have no electric charge, free electrons have no spin, leptons have no color charge (this term is not to be taken, here, in the literal sense). Which makes the properties of a particle, wouldn't it be rather, its potential to interact with any other particle capable of doing so with it? However, this potential can only be determined randomly or statistically, given that quantum mechanics, which continues to build and deconstruct, is essentially unpredictable and insufficiently understood.

Mass gives tangible reality to what we observe, and any observation can only refer in one way or another to the recognized matter. Observer and subject observed have, in fact, one thing in common: they are both physically subordinate directly or indirectly, to the state of matter.

Having no mass nor charge, the EMW have no differentiated symmetry and would interact equally with matter and antimatter. The energy they carry, structure and deconstruct both our Universe.

For the same level of energy, we have a form of equivalence between mc2 and hf. There is therefore a substitution ratio between baryonic matter and radiation. However, with regard to the «singularities» of beginning (Big-bang in the phase of initiation of time and space) and end of Universe (MMBH «at rest» in a cooled Universe in the phase of annihilation), these 2 constants because they refer to the notion of time (…/second), cannot be considered. In difficulty to imagine such events without referring to time, we are then reduced to speak of singularities.
The «disproportionate» energy gathered during the Big-bang could only ignore the physical laws that do not exist at the beginning and that govern from our Universe. The idea of singularity does not call into question the ideas

remarkably developed since Einstein and some predecessors without which they could not have carried out their discoveries. The latter only concern what follows the Planck wall (opening of time) and to be described, refer to the incompressible units (!) of Planck. This mathematical artifice invites to imagine a prior of virtual nature, to our Universe and leads to establish a kind of demarcation line with the after, in other words with unrecognized quantum exchanges between quantum symmetries that escape our sight but on which our Universe would rest.

- **Big-bang**

It is the threshold of an open door to the radiative entanglements of primordial radiation in the conventional form of elementary particles.
This "event" without duration, which cannot even be described as phase change or transition, represents the opening of a space where time is established with the first interactions.
The primordial energy is totally kinetic and does not distinguish symmetry. The wave frequencies are somehow smoothed and not meaningful. The modalities of preservation and evolution of this energy will make the history of our Universe.
This break in the cosmological balance that is the Big-bang, generates an excessively high energy field in a not circumscribed space; empty of gravitational effects. With an immeasurable energy power, it presages electromagnetism by developing a kind of gamma radiation in unsuspected frequencies. The energy deployed is commensurate with the binary universe system that unfolds. Wavelengths and differentiated frequencies begin to reveal. Radiative entanglements and nucleosynthesis will be the extension.

The primordial energy «awakened» during the Big-bang, cannot be described in terms of temperature which is an entropy-related variable and assumes a temporality of events. Time will open with the first radiative entanglements that will distinguish quarks, electrons, neutrinos, and probably other elemental particles that have disappeared since or maybe to be discovered. Produced by these innumerable radiative entanglements, only elementary classified particles whose the nature and the interactions integrate to a relative stability of the potential energy of mass. All forms of interaction and particle types, as well as all processes that may be imagined in the context of nucleosynthesis, are not allowed. They must satisfy the pre-determined deconstruction process in the symmetry break generated by the Big Bang and somehow predetermined. The complexity of what makes our Universe would derive in fact, from a fine,

unavoidable and «pre-recorded» setting of parameters and standards fundamentally related to it since the beginning.
Thus, we describe the electronic field of an atom by reducing it to a quota of fundamental orbits load carrying. These restrictive conditions are the guarantee of a relative sustainability of the matter necessary to lead to its deconstruction or more precisely, the return to the cosmological balance. This can only be finalized by gathering all the energy of the Universe, in a configuration in «bottleneck» excluding in the long run any form of gathered energy other than that of black hole.

Heat is an indicator that allows us to imagine these primary phenomena in a nascent Universe being ionized (which presents pre-manifestations of charge). The primordial diffuse energy, totally kinetic energy, without mass or declared charge (precursor of the EMW) is disturbed by the occurrence of the first radiative entanglements which realize in symmetry the primary particles of matter and antimatter. The dispersal areas taken up by this primordial energy become increasingly crowded by the presence of massive particles. The Universe is gaining weight but frees up the so-called empty space.

It is the matter that by agitation, makes the heat. Whatever its intensity, a laser beam does not produce heat in the space empty of matter.
In this way, an irreversible evolution is set in place which means that the potential energy with its gravitational effects, will replace the primordial kinetic energy.

A sudden rise followed by a gradual lowering of the temperature accompanies these first interactions. The excessively intense radiation that marks the beginning of our Universe, interferes with itself and the emerging matter. All these interferences will break the uniformity by generating fluctuations of intensity, called frequencies in particularly short wavelengths. This emerging form of granularity of the primordial plasma conceals a fracturing of the energy of mass by 2 symmetrical states. At this point, space-time is open. The temperature continues to decline with hot spots. Wavelengths increase in contrast to their frequencies.
Without delay, the two symmetrical states of the matter will begin to interact. In this primary plasma so excited, will begin to be distinguished electrical currents and magnetic deviations. Pale persistence of the radiation representative of the early days of our Universe, the gamma rays observed are mainly the result of the collision of high-density stars.

This plasma during ionization will be the cradle of an embryonic matter in search of a status. The first particles that will result, will become mainly:
- what could be at first, neutrinos and antineutrinos, precursors of charged particles (see chap. XIII) and will contribute to the balance of exchanges during nuclear reactions: neutrinos and antineutrinos
- which will secondly realize, the building blocks of the atomic nucleus: the quarks and their antiquarks
- and which will endow this nucleus of significant charge with a belt of particles of equivalent opposite charge: the electrons and their antielectrons

Perhaps it is appropriate to return here to what would have been the plasma state of the beginnings of our Universe, which is so special and corresponds to nothing that we can approach concretely.
The plasma we know is a set of electrically unstable gas that leads to the fusion plasma. This plasma is not the plasma concomitant to the Big-bang and which is at the origin of the primordial nucleosynthesis, nor the one which realizes a black hole.
These plasma states could be defined as brief transition states marking the beginning, the evolution and the end of our Universe. They are part of complex processes that we could imagine as follows:

- Primordial plasma is a kind of «bubble» of unstable energy without significant temperature and which excludes any corpuscular approach.
- This ephemeral energy plasma, «smooth» and without remarkable movement will present irregularities in the form of primordial radiations called to interfere between them and which will later constitute the EMW that we know.
- Interferences called here radiative entanglements will make this energy bubble representative of our future Universe, a kind of plasma soup cluttered with charged primordial particles in interactions.
- In this evolutionary plasma, these primary particles would be in some way the embryos of our current neutrinos themselves likely to be at the origin of atomic particles in their diversity.
- The temperature then reaches a climax which, when falling, will lead to distinguish particles of contrary charges but of the same intrinsic moment (spin ½) in a context of broken symmetry.
- Let us consider that at this stage where time does not yet have its place, we have crossed the Planck Wall. In this extremely hot plasma, the primary particles of opposite charges attract themselves, those of the same charge

repel themselves. Others that will make our current neutrinos, retain a neutrality that will contribute to ensure the relative stability of the matter.

- The temperature continues its fall. Time and space have taken concept. The first particles will evolve to become the quarks, electrons and neutrinos. The formation of nucleons (composite particles) from these elementary mass particles, will be the prerequisite for the constitution of ions and atomic nuclei.
- With the primordial nucleosynthesis, the Universe loses its plasma status, to evolve under the influence of nuclear force that is taking place in the heart of the stars in formation (stellar nucleosynthesis). Nucleons by binding will make atomic nuclei (so-called recombination phase). The elementary and composite mass particles which make up the atomic nucleus, seem to be unable to persist once they leave this one (with the exception of the proton which has the particularity of being self-sufficient as the nucleus of the lightest and most widespread atom; the hydrogen atom).
- The electrons under the effect of free radiation (EMW) interact with the newly formed atomic nuclei and achieve the electromagnetic charge equilibrium of the atom
- The grouping of the atoms thus stabilized, will allow the formation of hydrogen clouds with the presence of heavier atoms such as helium.
- Concentrationary evolution (or depressionary rise of space) will lead to the formation of molecules, stellar bodies gathered in galaxies within large-scale structures that may make one doubt the homogeneity that we lend to our Universe.
- Aware of the speculative nature of our approach of the very beginnings of our Universe, we nevertheless came to develop a so-called standard cosmological model. This model far from explaining everything, is controversial on many points. But it gives a satisfactory interpretation of an environment of which we are an integral part, though in an insignificant way.
- We will find some kind of plasma state without significant temperature reminiscent of the beginnings of our Universe, within the MMBH of a cooled Universe about to collapse.

Today, protons, neutrons (proton having interacted with an electron and unstable outside the atomic nucleus) and electron orbital belts would represent the stabilized models of elementary particles assembled (or charged complex wave packets) at the base of the constructed matter.

The electronic neutrinos discovered later, are supposed to "regulate" the transport of energy by acting as a "safety valve" and as adjustment elements within this assembly module that is the atom. The neutrino, a kind of hybrid photon endowed with mass or electron devoid of charge, has its raison d'être in the fact that it helps to finalize quantum interactions without disturbing because of its absence of charge, the relative and necessary neutrality of electric charge of the atoms (see chap. XIII).
The sequel, which highlights what appears, among other things, as energy transfers between electrons and photons, is more accessible to our curiosity. The photon carried by the electron, which it somehow dopes, remains the «vector» which ensure the maintenance of a fragile balance of forces within atoms and molecules.

The phenomenon of radiative entanglement can be described as a constructive conjunction of primordial waves under particular interference optimum conditions. By accumulating their energy, these waves would create additional frequencies, eliminating the undulatory aspect in favor of a more compact «texture». Some of these «grains» of energy will be brought closer by charge interaction, in a form of property sharing (see chap. XVI on the so-called strong force), to form nucleons. Thus the charge neutrality of the matter is achieved. The charge conflicts produce on the subatomic scale, the same effects of approximation as the gravitational force. This leads us to think that the latter would result at the macro scale, a local deformation of space/ time which would be due to the addition of electromagnetic interactions of a quantum nature, achieving charge neutrality on the atomic scale.

The neutron would be the product of a proton having mutated by capturing an electron and an antineutrino. The free neutrons are unstable and cannot endure except to ally themselves with protons, realizing the nucleus of the atom.
Neutrons by their presence act as both a buffer zone and a cement office ensuring cohesion within the nucleus, protons subjected to the electronegative effects of electrons (see illustrations). These 2 types of nucleons, associating in a quasi-fusional way suggest the existence of a force in relation, called strong nuclear interaction. The electrons, because they have a negative charge and also provide valence bonds between atoms, contribute to the achievement of the globally neutral atom. Their properties are therefore decisive in the construction of the constructed matter.

An electron that absorbs a photon becomes a bundle of intricate waves enriched in kinetic energy and thus equivalent/mass. This kinetic energy endowment will move it away from the related atomic nucleus and possibly make it change partner nucleus. Thus, the electron shared between several atoms achieves the molecular bond between atoms. On the other hand, an electron that emits a photon loses energy which has the effect of making it go into low orbit. It is all about waves in these influence-sharing games in search of charge balance. The stationary state of a particle or atom corresponds in theory, to a state of equilibrium that reveals no remarkable interaction. In fact, information continues to be exchanged. Thus, the electron by performing elliptical orbits at a speed that constantly varies during each orbital course, shares information instantaneously with the assigned nucleus and neighboring atoms (binding forces). The relative stability of the molecules is at these conditions. In an atom, the electrons exchange with each other while maintaining the distance necessary to balance the system they represent. In reality, they form an electronic cloud in sharing information captured by a quark's nucleus globally of opposite charge. The atoms by gathering, share by charge influence game, with their vicinity their electron belts. EMW contribute to these exchanges by transferring, giving or recovering to the electrons the necessary amount of energy. To summarize, it is the photons that modify the velocity and trajectory of the electrons, allow the molecular bonds and give the constructed material a relatively durable structure. As we shall see later (see chap. XI): that the photons discreetly exchange with the antimatter, would not be without impact on their interactions with the matter.

- **Self-programmed deconstruction of the binary system of universes in quantum symmetry.**

The EMW in dispersion, absorption and refraction gradually lose amplitude. In the beginnings of our Universe, waves with considerable amplitudes and high frequencies continued over an extremely short period, at a less and less sustained pace, to entangle to create particles that assembled in lightweight hydrogen atoms mainly. Some of the primordial kinetic energy has, in this way, been mobilized by the matter. It constantly interacts with free electrons and those that constitute the electronic layer of newly created atoms. The temperature keeps dropping. **The EMW show a generalized lengthening of the wavelengths. Their light spectrum tends towards the red. This finding inspired an exotic theory known as the aging of photons, which has since been abandoned and which wanted mainly to confirm the hypothesis of an**

expansion. In a cooled Universe, these free photons, poor in energy, will eventually develop excessive radio wavelengths until the space, dug to the extreme, empties itself of any form of notable occupation. However, the totality of the energy of a universe does not in fact suffer any loss. In the end, all this energy will end up in MMBH as the final step.

The totality of the energy contained in a binary system of universes in quantum symmetry, at all stages of its evolution could be written for the essential:

Potential energy (mc^2) of the inert masses in each symmetry + kinetic energy ($\approx 1/2mv^2$) corresponding to the movements of all that is significant of matter and antimatter + energy (hf) carried by the electromagnetic radiation of the «empty» space interfering in the 2 symmetries.

In this equation, the masses are growing in density, until in a Universe at the end of life, brought back to the mere presence of MMBH, unstructured matter and antimatter no longer show any agitation.

The constant **c**, which represents the speed of light, tends to become then a superfluous constant.

The average level of the "free" wave frequencies (not entangled in wave packet) continues to evolve imperceptibly but inexorably downward. Also, **h**, the Planck constant should eventually reveal a non-significant value.

As wave and corpuscle, radiation and matter are the same representation of a given amount of energy. At the root of its quantum constituents, matter retains the imprint of a broken symmetry. In search of symmetry, it will be realized internally in each of the «parallel dimensions» that are matter and antimatter, a substitute for it of a quantum nature. **Necessary for this, a balance will be achieved by providing an electric charge, particles having a particular intrinsic angular moment defined as a half-integer value spin.** It will be the same for the antiparticles which by ensuring the neutrality of each pair, will acquire an opposite charge. This is how electrons have a negative charge, contrary to that of nuclei consisting of charge + and – quarks but which are globally positive charge. Antimatter is like matter, globally neutral. Similarly, antielectrons have a positive charge, inverse to that of the charge antiquarks - and + but which are globally negative. **This neutrality of common**

load and shared at all levels, will allow to realize by coalescence matter/ antimatter, the return to a broken cosmological balance.

To stay on the case of the electron, it is presented as a beam of waves traveling a plural orbit or more precisely an ellipse fluctuating at a good distance from an atomic nucleus. The orbit that is supposed to give the trajectory of a particle, like the electron, is our way of representing ourselves mathematically, an atom in a state of equilibrium. Nothing allows to say that the electron as particle physically rotates around the nucleus. It is attached to a nucleus following a configuration dictated by the charge equilibrium of the atom in a more or less stable molecular context. An atom then becomes a separate system as such. Unlike the particle, it manifests a physical presence that we can record in the space and time of Einstein's relativity.

To say that particles revolve around the nucleus is an image that disappears as soon as we dematerialize this particle which cannot be defined then by a precise positioning. But, stay on the idea of electronic particle necessary for the charge neutrality of the atom, ordered that there are as many electrons as the nucleus contains protons and that these electrons share a synergy in the form of orbitals. In this logic, the latter could not be definitively attributed to them but in response to the precariousness of the charge balances that realize the assembly of molecules. The electronic horizon of the atom is of negative charge (-) and adapts its intensity by standing on orbits that are therefore appropriate, in relation to the mass of each atom. For its part, the nucleus that is not uniformly charged, plays with its proton/neutron configuration in accordance with the kinetic movements of its electronic horizon. In this way, a fine balance is achieved managed mainly by electromagnetism, in the context of permanent exchanges between the nucleus, its electronic cloud and other connected atoms (see illustration lithium atom).
The electron would have to leave the affected nucleus, if it were like the photon devoid of mass, or hit the nucleus if it was endowed with a surplus of mass, except to modify speed and perigee of revolution accordingly. Its load is in adequacy of its mass as small as it is (1/1850 of the proton mass). A tiny variation in the relative mass of the electron, in relation to its velocity of movement and orbital trajectory, allows it to maintain a respectful and necessary distance from the nucleus. This adjustment in energy provided by photons, induces the electron also to jump from one atom to another. The electron has no atomic nucleus assigned to it definitively. By jumping from one orbit to another or changing partners, the electron disappears from the observed

atom in discrete mode. The electron structures the matter by traveling in a field of molecules. Its speed varies in this manner constantly and imperceptibly depending on a molecular environment which is constantly evolving.

The atomic nucleus is in a way, a minimalist center of gravity. The nucleus is described as an assembly of quarks (elementary entities with mass). These are grouped into protons or neutrons. In an atom, the former is supposed to represent an amount of charge energy in accordance with that of the electrons. The neutron is only a "deactivated" charge proton which, by changing the nature of some of its quarks, contributes to maintain the charge neutrality of the atom.

The photon, a particle called virtual (in the absence of mass), makes it possible to explain the losses and acquisitions of energy by electrons, by conveying and transferring of energy quanta between them.

Note that a past period of sub-atomic scale offloading, would explain that we found little trace of the heavy quarks (C, T, S, B) that would have “fragmented” into lighter particles (U and D). As with the quarks, we can assume that other generations of fermions partially disappeared and heavier than our neutrinos/Ve and electrons/e populated the young Universe in abundance.

Exchanges take place, driven by the fundamental need to preserve the fragile balance of matter. Protons and electrons, complementary and almost indestructible charges except nuclear accident, are currently in the phase of material load balancing. In the evolution of our Universe, this updated would be only a preliminary and necessary step to return to the cosmological balance leading to the final collapse.
If we could ask the memory of a proton, which would imply that it retains in a "indelible" way the memory of its past from the beginning, the major part of the history of our Universe would be revealed to us. But this assumes that for these particles, veterans of the Universe and that we imagine endowed in this case with a certain form of memory, time has a sense to the scale that is theirs. However, nothing says that time is to be considered when one evokes the properties of the elementary particle. Moreover, their memories could not trace back beyond what we call the Planck Wall (the first radiative entanglements constituting the particles of matter). Also, we who are an assembly of these particles grouped into atoms and molecules, are we really able to formulate otherwise than in the form of hypotheses, what could be the primary cause of

what created us? To pretend to go back further than what preceded this singularity improperly qualified as a root cause, is enough to leave skeptical. Yet, this is what we are talking about when we evoke infinity, eternity or when we entrench ourselves behind deities and other equally irrational fantasies.

If protons and electrons, the main constituents of the atom, have a certain stability and life expectancy aligned possibly with that of the Universe, the same is not true of the atom. An atom is the product of a succession of nuclear reactions by fusion or fission from hydrogen molecules. In the genesis of the Universe, the ionized hydrogen atoms that represent the starting point and development of matter have gathered in molecular form into clouds called HII regions. These clouds by densifying and loading of the energy carried by the EMW will form the stars. It is these latters which by secondary nucleosynthesis will produce the heaviest atoms. These will be partly dispersed during stellar collapses (supernovae) which are the origin of the planets, neutron stars, black holes and other astral bodies realizing the galaxies. The first important groupings of matter, a kind of giant protogalaxies, would have formed from the particularly dense ionized hydrogen clouds that made the primordial Universe. The Universe presents at its beginnings a topology undifferentiated, in the absence of remarkable gravitational effects. By mixing with relativistic velocities, currents will distinguish themselves from the regions of space that are densifying by grouping together the hydrogen molecules. This phenomenon, related to a time that would seem to us more fluid or accelerated (Einstein's relativity), causes a rise in temperature of these giant proto galaxies that marked the beginnings of our Universe. These conditions will lead to the formation of the first astral bodies and explain the development of vast regions of space, poor in matter. These desert areas draw, on a very large scale, the "spider web" texture of our Universe. They are not really empty and could today be occupied by isolated black holes extremely massive but difficult to detect. This is what would remain of the first galaxies after they were phagocytized by their central black hole. The properties of space at the beginning of our Universe, suggest that these first galaxies disappeared today had to be of a dimension unlike those formed later in a space more impoverished since in gases, loose particles and free molecules.
In this way, gigantic galaxies with a particularly active central black hole, supplied directly by this nearby and abundant hydrogen, could have quickly formed.

At one time or another, an atom will have a more or less heavy nucleus that will make him more or less stable.
This stability of an atom depends on the composition of the nucleus. The most stable atoms are of reduced atomic mass (sum of proton masses + neutrons). Few isotopes are stable beyond an atomic mass of 209 and all isotopes with an atomic mass greater than 238 become unstable. Furthermore, beyond 82 protons, nuclear interactions do not ensure the integrity of the atomic nucleus. This is also the case for nuclei of atomic mass 43 and 61 that do not have a stable isotope. Within these limits, isotopes are generally stable when they gather as many protons as neutrons, with some exceptions such as beryllium 8, which participates in the stellar nucleosynthesis of heavy atoms such as carbon. Moreover, beyond 137 protons in a nucleus, it would seem that the nucleus is no longer able to provide stable electronic orbitals for more than 137 electrons and that binding interactions cannot be maintained. The balance of matter is therefore fragile.

Atoms are more stable if the orbitals are filled (example: deuterium, lead 208). Similarly, atomic nuclei are relatively stable when nucleon «layers» are saturated. This increases the binding energy (example: helium4, lead 208 which is doubly stable). Note that the notion of quantum layers used here, cannot be taken in the classical sense of strata adjoining each other.
The neutron has lasting existence only in confinement assured by the presence of protons within the nucleus. This amounts to thinking that protons need to add these neutral charge composite particles in order to regroup in a stable, durable way and increase the atomic mass. Apart from the most common isotope of hydrogen consisting of a single proton and a single electron, atomic nuclei cannot be formed stable without neutrons.
Why is the average lifetime of the free neutron before its decay so short (15 min maximum), while that of the proton is particularly long?
The neutron is a composite particle consisting of quarks and whose electric charge is globally neutral. This is not the case with the positively charged proton. While the antiproton is of negative charge is contrary to that of the proton, the antineutron has the same neutral charge as the neutron. The quantum correlation between symmetry (phenomenon different from the nonlocal quantum entanglement between particles of the same quantum symmetry) would therefore not be the same between proton and antiproton as between neutron and antineutron.

It is questionable whether this would not explain the instability of the free neutron (not confined in the atomic nucleus). However, this synergy in relation to quantum symmetry remains to be understood.

It is on this pattern that matter takes shape and densifies itself to produce massive stars, neutron stars and to break up into stellar black holes.
The atom keeps changing configuration and this mainly in two ways:

- By nucleosynthesis, under the effect of increasingly high temperatures and pressures produced at the heart of massive stars. Succeeding the phase of radiative entanglement, nucleosynthesis is a phenomenon that achieves the construction of atoms heavier than hydrogen. It materializes in large part within the stars. During explosive events, this nucleosynthesis can produce particularly heavy atoms, such as fer56 (one of the heaviest stable metal atoms). Under these conditions, a number of these heavy particles (mainly carbon, nitrogen, oxygen) projected into space will join the diffuse particles of a cosmic "radiation" swept away by electromagnetism. But also, these particularly violent events (supernovae, novæ) that mark the end of the life of massive stars, break the atoms and disperse their electronic layer. Lighter atoms such as hydrogen and helium will then form new interstellar clouds.

- By photodisintegration, above a temperature of several billion degrees produced within super-massive stars. In this phenomenon, the heavier atoms "attacked" by an excess of highly energetic photons, are similarly fractured into lighter atoms.

In these shared cycles where nucleosynthesis predominates, light atoms will become increasingly rare. Like free particles of cosmic radiation, the totality of the matter that constitutes the stellar bodies, will eventually join the black holes of a Universe that cools.
The changes in mass are made by energy adjustments. Particles without charge but not totally devoid of mass called electronic neutrinos (sometimes M, T) participate in this fragile balance, contributing to the redistribution of energy during nuclear reactions where quarks are transferred between neutrons and protons. In this logic of force vectors, bosons without charge and mass (called gluons for so-called strong interaction and photons for electromagnetic interaction) would act as mediators by framing these exchanges thus «channelled» (See chap. XVI relating the so-called strong force to the electromagnetic force). Other bosons (Z and W), large masses, without charge

or for certain related charge, are supposed to intervene within the atomic nucleus, giving visibility to the load-shedding and rebalancing of the electroweak interaction (see chap. XVI on the unification of electromagnetism and weak force).

Space and time are quickly out of competition in quantum physics where the interactions between matter particles cannot be properly transcribed in terms of displacements. The problem is that we equate these interactions with exchanges. An exchange, in the classical sense of the word, induces a displacement and a duration in the transmission of information. A suitable response was found for the charge transfers with the photon considered as vector of the electromagnetic force. Virtual particles (in the sense of unobservable) called gluons, Z, and W…., were added to justify so-called strong nuclear force and so-called weak nuclear reactions. By thus dressing interactions in quantum physics, this artifice stages processes or vectors of exchanges called bosons, without which, from our point of view of observer subject to time and space, we could not conceive these energy transfers.

The matter/antimatter symmetry in equal parts, would exempt from having to involve all these bosons to transport energy between particles and between them and antiparticles. Photons remain vectors carriers of vacuum energy. They would intervene in unobservable charge interactions between symmetries and those that participate in the charge equilibrium of the atom. Electromagnetic waves open to each symmetry, in "dimensions" of their own, would then play the role of mediator in these discrete exchanges. Such an archetype is similar to the one advocated by the theory of supersymmetry, each particle finding in its antiparticle, a partner particle of interaction.

We could represent these potential interactions between particles and antiparticles by strings, one-dimensional objects, joining on this point, the very hypothetical theory of strings. Taken in a context of multiverse Cosmos (its conceptual origin) and chirality (its unrecognized cause) evoked here, we find in this paradigm the unifying theme of M-theory.
In a more global approach, the bosons can be understood as discreet exchanges factors at the « osmotic» border of 2 quantum symmetries. The particles, once associated with bosons chosen by design, have the faculty in our eyes to play with distances (see chap. X). The theory of supersymmetry would like to confer on each elementary particle of matter intrinsic properties that mirror those of

the associated bosons. **In this case, the bosons would be excluded from the inventory of particles. This unsuccessful theory amounted to establish that the bosons prescribed in our standard model, are only a necessary artifice to the understanding of phenomena that we are unable to explain otherwise in the state of our progress.**

Nuclear fusion and fission constantly alter our fields of observation at all levels. These interactions, called weak, represent spectacular manifestations of accidents, nevertheless necessary, to correct certain imbalances in the programmed evolution of our Universe. To the benefit of cohesion and the gathering of matter, could they not result from discreet exchanges between quantum symmetries, with the consequence that the heavy elements, produced by nuclear mergers, will become increasingly rare in the free and diffuse state?

One way to represent the forces which make up our binary system of universe in symmetry, is to refer to an image that challenges us, in other words, to give them a physical appearance more in line with the primarily cognitive vision of ours. The logic artifice chosen is to describe these anticipated conflicts of intricate energy, in terms of mass, charge, colour, of displacement and intrinsic movements, among others. From these identification criteria, we can then classify the elementary components of the matter into quarks, leptons or bosons. This nomenclature corresponds to a certain analytical vision that we have of our Universe. **Curiously, quantum physics would lead us to think that particles and antiparticles that share the two symmetrical states of a same binary system of universe, do not really have phenomenological existence. This is not incongruous, since it is accepted that particles and antiparticles annihilate each other when confronted with each other. Everything becomes potentially virtual to the extent that the energy they represented, is destined ultimately to return to a multiverse Cosmos without physical reality.**

What is the energy? The question seems to sum up the whole problem of our Universe. This thing so difficult to define presents itself to us in different forms but essentially under the appearance of radiation or electromagnetic fields and matter or gravitational fields. If this observation does not bring us anything that is really of a nature to respond to it, would there be another way to direct research on the fundamental nature of this reservoir of force that built, animates our Universe and will undoubtedly lead to its deconstruction?

Our most remarkable advances in this area often prove to be the extension of dissident thought exercises. These avant-garde ideas generally have the particularity of being counter-intuitive. Indeed, they led to the manipulation, contrary to common sense, of the concepts of time and space, or to disregard them, making us lose our bearings. The discernable environment on which our reality is based is described in measures of distance, location, displacement, duration, exchange, in short in terms of space and time. Thus, the term c^2 in the famous Einstein formula ($E = mc^2$) referring to the speed of light propagation is a ratio of space travelled over elapsed time. The problem is that deep down in quantum mechanics, with in particular the non-locality of intricate particles, time and space seem to no longer have the meaning we give them commonly. Quantum entanglement characterizes a twin system that can only remain so if the particles concerned are not affected in their fundamental nature (which defines each type of elementary particle). Entangled particles do not transmit energy or even information from one to the other but form a system with two or more components, having a common predestined state. This makes it seem that they communicate simultaneously, ignoring in these exchanges any speed limit. General relativity is left out.

In theory and based on observations recognized at the supra-atomic scale, everything that makes the construction and evolution of our Universe is based on 3 principles that however seem violated in quantum mechanics and are:

- the principle of locality: two distant objects cannot interact instantaneously; any transmission cannot be done in excess of the speed of light.
- the principle of particularism which attributes to any physical entity and in particular to any particle its own unique properties.
- The principle of causality: any cause being the consequence of a preceding phenomenon, resulting itself from an earlier cause.

Two entangled particles would constitute a more or less linked system, implying the idea of non-separability of its components perceived as distant. This leads to think that these so-called entangled particles by freeing themselves from space and time, violate at least the first principle.

But this correlation by quantum entanglement could perhaps be explained by the existence at the origin, of a common heritage that made the properties of a particle, an embryo imagined at the origin of all current particles. These properties would have been retained and would remain more or less shared. Although excessively counterintuitive, this use of non-local discrete properties assumes that some hidden variables cannot be considered in a wave function. This artifice of thought which joins the idea of superposition of states, has the merit of not having to consider that could be transgressed the principles of locality and causality. If, experimentally, Bell's inequalities seem violated (paradox EPR), it would therefore be only from the point of view of an observer who is not able to access certain quantum information called for this, hidden variables.

This mathematical subterfuge that are the hidden variables compensates for the difficulty of considering space/ time in quantum mechanics and leads to accept a form of indeterminism. This indeterminism is manifested especially when we want to know simultaneously position and speed. It translated in fact, our inability to access all the information that make the properties of a particle.
An intricate quantum system (2 distant particles linked together) cannot be described by reference to space and time if we consider that the properties intrinsic to the particle cannot define themselves, in terms of space occupancy and duration. The elementary charged particle then becomes somehow, at the subatomic scale, the unrecognized trigger of gravitational force. In the end, the hidden variables make it possible to build a bridge between classical physics and quantum mechanics, thus remedying a certain quantum indeterminism and leading to a less restrictive rethinking of the concept of space/time.

We come to doubt the overall perception that we have of our Universe. It seems that by pointing our gaze to the infinitely small or infinitely large, time and space are not as recurrent as at our scale, that of an observable environment of any relative proximity. So, energy in its most fundamental form would ignore time and space? Although the idea is at least disconcerting, not to say inconceivable, would it not be more appropriate to consider that in quantum mechanics, time and space are no longer dissociable as we do in general physics in our feeling of space/time. At the scale of interactions between elementary particles, time and space seem to lose the distinctive meaning that we recognize in them. The measurements of location, displacement, and velocity that would make it possible to understand the dynamics of particles seem not to be able to be determined together in a significant way. The arrow of time is no longer traced in advance, space loses its depth and information seems to flow without light speed. This observation, which does not satisfy the principle of causality on which our thinking logic is based, tends to make people believe that quantum mechanics would not be deterministic.

Superposition of states, quantum entanglement, tunneling and delocalization are phenomena that clearly go against a thought logic that is suspected to be obsolete or inappropriate. And for good reason; these totally counter-intuitive phenomena suggest that the elementary particles that make quantum mechanics would ignore time and space even though the extension of their interactions prefigures space/time in a Universe perceived on a macroscopic scale as a assembly of massive objects in rapprochement interactions (electromagnetic and gravitational effects).

To agree with this conclusion, in fact, amounts to making a largely misunderstood mechanics of elementary particles incompatible with a more general and more accessible physics of a world observed on a macroscopic scale. Would not it be more judicious to consider that space/time is a concept emerging from the quantum dimension and that we are not ontologically, in ability to represent for us this mode of transition between what tends towards the infinitely small and the observable material world. Recognize that this disability related to our condition is rather frustrating. It would however explain our embarrassment in building a unified model free from observation scales. The concept of space/time would therefore only concern the awareness of an observer realizing that he is in a state to intervene locally and in a given time on an environment that he perceives as identical to his image. This awareness, which implies that any measurement results in a reductive vision of the phenomenon observed and fundamentally considered as a wave packet, is called quantum decoherence. It is a way of recognizing our intellectual limits in our ability to conceptualize certain phenomena that would be at the origin of our Universe, explain its evolution and predict its destiny. Moreover, the tools that could allow us to advance in the understanding of the Universe. are proving more and more difficult to design and implement. A virtual energy in its foundations; why not even if for us it seems totally irrational! We already practice, not without a certain ease and with a lot of freedom, abstraction when we speak of advance metaphysics, of existentialism or of religious beliefs. This concept of virtual energy should lead us to reconsider both our standard table in particle physics and the cosmological model that was inspired by it.

For any observation we refer to the notion of time in a circumscribed space. But in quantum mechanics, particles seem to play with distances. Also, to say that a particle can be in several places simultaneously or that a wave can propagate in infinite speed, that is to say without relation to time (tunnel effect or Hartman effect), is to agree that such an entity is potentially everywhere at once. This seems to be in contradiction with the notion of space/time references of general relativity which does not allow to speak of simultaneity for distant events. The distances are then abolished and failure to observe firmly established, elementary particles have all virtual entities. That a particle is potentially everywhere at once, means that it is able to change state without displaying the reason locally. It is this so-called status of superposition of possible quantum states (see chap. X), which would allow symmetries to exchange discreetly in an unrecognized chirality context, without having to imagine supraluminal exotic particles, such as tachyons. We could imagine and are able to create experimentally (CERN) all kinds of exotic particles and possibly as much exotic atoms. But these entities cannot have a lifetime because they do not fundamentally have a raison d'être, they cannot find their place in our Universe.

Not being able to discern the discrete interactions that «connect» the 2 quantum symmetries, leads us to describe the phenomena that we are given to observe, in terms of uncertainty and probability. Values that are not precise are then supposed to be defined in statistical bases.

- **Cooled Universe**

In a cooled Universe populated mainly of MMBH, the light-speed has not significant value. The EMW have been absorbed by the matter now unstructured at the core of MMBH which shows no thermal energy. No frequency of oscillation of what atoms were, now “melted” intimately into each other, is detectable. The Universe has recovered a critical state which is only an extension of the one that preceded the electromagnetic decoupling.

In a cooled Universe, black holes are neutral of charge, do not occupy space now in total energy depression and physical laws of space/time become obsolete. Can we reasonably assume that all physical laws that frame the history of our Universe, are immutable? Are they in their complexity at our fingertips? It seems that we ignore most of some interactions result of hidden variables such as those that seem to fall within the principle of non-locality. Our standard cosmological model would prove to be an incomplete theory, lacking in coherence and therefore in need of widening, even reconsidered. Indeed, among other points:

- It cannot describe nor explain the Big Bang
- It does not address the origin of space and time but is based on the concept of Space/Time framed by relativity.
- It is unable to explain the arrival of matter at the very beginning of the Universe.
- It does not integrate really the gravitation with other so-called fundamental forces.
- It predicts an antimatter but cannot justify that it is virtually absent from the observations.
- It cannot explain a supposed lack of so-called dark matter, as prescribed by the standard model, or even provide information on its nature.
- It fails to justify a supposed accelerated expansion of the Universe other than by the existence of a mysterious "dark energy", which has never been detected in its own right.
- He remains incomplete about what could be a possible end for our Universe.

This plural singularity (the set of MMBH) predicted here and which represents the final stage, has the potential to be described as a not localizable gathering of energy without remarkable intensity, but of extreme density. It is only in this case that the particles, if they had not lost their particularism, could have been assumed at rest. The wave/particle duality is no longer required. Universe and "anti-universe" thus confined "in parallel" will annihilate themselves finally by restoring an undifferentiated energy to the multiverse Cosmos.

Whether these interactions between symmetries are imperfectly described or insufficiently understood, simply means that we encounter real observational and investigative difficulties in research that changes in nature by scaling. Discreet interactions would be decisive in the fragile balances that accompany the evolution of our Universe. Take them into consideration, would allow to make the link between what could be the infinitely large and the infinitely small, 2 concepts that have meaning only related to the idea of multiverse Cosmos.
The elementary particles of matter, in the context of the space-time that we give them, would be only a tangible, intelligible appearance of discrete

interactions between quantum symmetries (see chap. XXVIII). What we sometimes interpret as a violation of the universality of flavor (refers to particles that have similar properties in terms of interaction and common characteristics except for their mass) for fermions and especially leptons, would represent the observable extension of interactions that are not.

The Planck wall represents the end of the plasma era of the Universe not yet ionized and so difficult to conceptualize. What precedes the Planck Wall can hardly be described as part of quantum or relativistic physics, no more than can be the discrete interactions that would enamel the border between 2 quantum symmetries of Universe.

We could say that before the occurrence of the first particles, as in the most intimate of these particles, nothing is consistent with our reality. Everything becomes almost virtual in this announced «physics» of unrecognized interactions.
Before the point of «tearing» of these forces in opposite symmetries (Big-bang) and after the annihilation of matter (Final Collapse), nothing is accessible. The Multiverse Cosmos does not record any events. We can say that time is a notion related to space and calibrated by man to the measure of the fluctuations perceived as conflictual of matter in its most diverse forms.

An abandoned theory predicted that our Universe would end after a period of expansion by contracting and ending in Big-crunch. This theory is not so unrealistic if we consider that matter after a « retrograde dispersion » phase, will end up gathering under the aspect of MMBH. These latters could be considered, in their «apparent flight to infinity», as the beginning of a new Big-bang followed by dispersion and swarming of matter by reconstitution of black holes. Surprisingly, Stephen Hawking had put forward the idea that a black hole would open a passage to another Universe. This futuristic science image is not, either, totally utopian insofar as the symmetries gathered during the final collapse, could generate a new Universe, without it being possible to say that these two events are really connected. However, it is not certain that this mode of transport would be appreciated by the traveller who would travel it without certainty about his destination.

IX Critical thresholds and thermo-activity

(A thermometer story, for a rather hot subject)

Thermodynamics gives an order of magnitude of the energetic states of atoms, considering that these states are quantum phenomena. Absolute zero is the state in which particles connected to each other, have a minimum average entropy. This absolute temperature cannot therefore be considered as an absence of temperature. Simply, it implies that the particles that make up a set of atoms in the gaseous state, are slowed down, in a rather stable state and that the kinetic energy to ensure their chemical bond is at its lowest. But a gas in which the mean entropy corresponds to absolute zero does not exclude temperature deviations or more exactly different levels of entropy within this gas. Our Universe being not immutable, it is likely that this absolute zero says nothing absolute and that in certain quantum configurations, it could be corrected downward. Absolute zero is a theoretical minimum temperature that represents the complete vacuum of interacting matter particles. But this void, which bears its name badly, is not devoid of radiant energy. The potential of OEMs to create particle/antiparticle pairs is real. This dynamic of the void is likely to evolve as our Universe changes. Assuming that the potential energy of the vacuum decreases over time, the absolute zero set at -270 degrees would have to change accordingly. In a universe about to collapse, the hot spots will have disappeared. The temperature of the vacuum, which was a local indicator of the level of entropy, will no longer be a measurable property. The laws of thermodynamics will no longer apply.

Can we also talk about temperature for a black hole, once crossed its accretion disk? Recall that the elementary particle is neither hot, nor cold, nor bright, nor dark, and has no colors. But, temperature and light intensity remain indicators within our reach, the degree of entropy, interaction and instability of a body.

The concept of **critical threshold**, associated with that of **thermo-activity,** is interesting to understand the concentrationary evolution of our Universe and try to predict how it might end:

- As we have just seen, the particles constituting matter would result from a past phenomenon of entanglement of waves of excessively high adequate frequencies. The decisive level of energy required for this crucial radiative entanglement is delivered to the heart of a primordial «plasma» **(non-significant temperature),** unstable although isotropic, sign of a break of symmetry. In a time that follows, not measurable, the temperature of this brutally ionized plasma will reach its peak before starting to fall gradually. The first gas molecules, resulting from the first radiative entanglements, will then be able to form.

- We know that a gas cloud eventually densifies to a star. To achieve this, the critical threshold to be exceeded, is **called <u>Jeans mass</u>,** which implies that the gas cloud, as it becomes denser, reaches a sufficiently high temperature. If we consider that the lifespan of a star is in inverse relation to its mass, it seems that the size of a star cannot exceed 150 times the mass of our sun; due to internal pressures exerted there

- After exhausting its nuclear fuel, a star turned into a white dwarf in the nebula produced by its explosion, will be able to endure for some time in this state as long as its mass remains less than 1.4 times that of our sun. This critical threshold **called <u>Chandrasekhar limit</u>** will correspond to a temperature of the star of only several hundred thousand degrees.

- If its mass increases by accretion of matter, this white dwarf will give birth to a particularly dense star called a neutron star. In a compact neutron star, the pressure is such that the electrons have joined the protons to make neutrons, a neutral composite charge particle. Strong interactions that ensure the continuity of neutrons and which merge with electromagnetic interactions between quarks within these neutrons remain. But the neutrality of charge of neutrons means that they are not able to attract or repel each other by charge effect. In a neutron star the density is such that it puts the space dedicated to it in depression. Due to the gravitational effects that result, the neutron star will eventually collapse on itself by absorbing other bodies. **<u>Beyond 3.2 times the mass of the sun,</u>** the phenomenon becomes irreversible and take the form of a black hole that will absorb everything that cannot resist its gravitational power. A black hole can also be the product of the encounter of white dwarfs or neutron stars.

- The critical threshold **of <u>density "fatal"</u>** to the Universe will be reached when a certain mass representative of the primordial energy ends up integrally grouped in MMBH in a Universe in total space depression. This ultimate stage considers a temperature reduced to the lowest in a cooled Universe where time is slowed to the extreme. Chirality is about to be corrected. This absolute «cosmological» zero has no real meaning and cannot be confused with the temperature at which the bodies have almost no thermal energy (resulting from internal agitation). It is inappropriate that this minimum temperature, estimated at -273 ° and which in fact indicates a non-null temperature, is called absolute zero.

- The final collapse will bring together in a virtual point (without spatiotemporal coordinates) representative of the multiverse Cosmos, all the energy of what was a binary system of universe. Such a singularity cannot be described in terms of temperature.

There is another way to associate the notion of critical threshold with that of thermo-activity in the genesis of our Universe, if we start from the idea that the multiverse Cosmos is a virtual entity that cannot be described with data of temperature. The absolute cosmological zero necessarily excludes any presence of electric field. It seems that it is a peculiarity of these singular stars that are black holes. But what does the absence of electromagnetic phenomena mean in relation to the notion of conductivity?
Logically, the nascent Universe, devoid of significant electromagnetic effects, should before the Planck wall, show these same characteristics of not significant temperature and irrelevant conductivity.
A few degrees above this cosmological zero, will betray the first interactions between quantum symmetries. A conductivity that is no longer flawless, will soon manifest itself in this original opaque plasma by electrical phenomena, revealing the first radiative entanglements. The Universe will soon lose then its opacity, releasing the photons in a new context called recombination, with a wide range of wavelengths. The resulting resistivity with temperature rise, will stand out in each quantum symmetry from primitive forms of energy of contrary charges. In what was initially a globally smooth and homogeneous plasma, hot spots multiply.

This thermal agitation will transform this ionized plasma. Energy transfers in the form of electron flows will generate magnetic fields whose direction and direction signal the propagation of electrical phenomena. These fields are all the more intense as the loss of conductivity of the medium is significant. Today, EMW that evolve in a space filled with particles of matter, are what remains of a "left behind" of original energy after the first particles of matter occurred. This energy remained without mass has since lost much of its intensity because it is now in constant interaction with the matter.

In the evolution of our Universe, everything becomes a matter of mass density and gravitational power:

Classic Stars

The gravitational collapse of a cloud of gas and stellar bodies (nucleosynthesis) by triggering fusion and incidentally nuclear fission, will give birth to stars (yellow dwarf like the sun to supergiants like Betelgeuse). The larger ones will end up in supernova.

Neutron stars

At the heart of this scattering phenomenon of the outer layers, there is usually a compact neutron residue, the electrons having been captured by the protons thus becoming charge neutral. This usually results in the formation of a neutron star whose density no longer allows nuclear reactions.

Black holes

Beyond a certain density, by accretion or absorption, neutrons release their quarks and the neutron star changes completely in nature. The quarks and other particles possibly confined in the neutron star, then lose their physical properties and bind indelibly into one whole. Thus, a stellar black hole can form. They can also be the culmination of a binary system of heavy stars or represent the heart of a galaxy at some stage in its formation.

Back to the starting line

This is to assume that what was charged particles, finds within the black hole, its original status of wave packets. **A black hole would then become a mega wave packet in total synergy in an inertia state that makes it the equivalent of an elementary particle in which the empty space has no place. This would give the black hole the same status as the latter and make it a quantum entity on the edge of space/time.** In a universe of black holes, where space and time cannot be considered, the notion of chirality is no longer relevant. The symmetries that were matter and antimatter can then coalesce. Everything that in one form or another was energy in interaction, will thus find the original state of latent conceptual energy of a multiverse Cosmos.

In summary:

The imagined lowest temperature seems to remain a theoretical data. It would be that of a body in which matter, and more precisely the particles that make quantum mechanics, are frozen, without interaction and therefore without temporality, in an immutable space that does not allow any significant observation. But if matter, although without remarkable agitation, remains present, can we nevertheless consider that the potential energy of vacuum is in the same static state as baryonic matter and that electromagnetic waves no longer move? In which case, there is nothing to prevent us from thinking that this theoretical threshold of – 273,15 °C, extrapolated from the entropy of ideal gases, is not really representative of the lowest possible temperature. This floor temperature classified as absolute would be the indicator of a relative temperature revealing an absence of agitation of the particles of matter, rather than a minimum temperature, unsurpassable. In a Universe where the energy of vacuum would be put to sleep, where photons would be immobile and where matter would not manifest any interaction, space as time loses all meaning. But outside space/time, how to understand the notion of temperature knowing anyway that no observer would be able to refer to it?

The highest temperature imagined is also purely theoretical. Called the temperature of Planck, it would be the temperature of our Universe at the time of the opening of time and space, succeeding to the "moment" Big-bang. In other words, and in a more accessible way, it would be that of a body in a state of quantum agitation such that this body would emit gamma rays at frequencies so close together that they would be in the state of being superposed. Assuming that we are able to observe it, such a case implies that it would escape the normally unavoidable modeling and analysis process that is the reduction of wave packets. Indeed, the energy level of such a body would likely lead to the collapse of the body on itself realizing a singularity on the fringes of space/time. This singularity could meet the definition of a black hole, considered here as a transitional stage, prior to the final collapse. The problem is that in our approach to black holes, the notion of temperature loses all its meaning, thus marking the limits of our ability to conceive what falls within the unobservable. With these pseudo-objects that have nothing really black and which are hidden behind a border zone without return for any form of accreted energy, the future of our Universe remains an issue of conviction. The projection predicted here on its possible destiny, does not claim to derogate from it.

X E = m c2 in light

(An equation that highlights but does not illuminate everything)

Where E= energy, m= mass at rest (therefore corrected of the energy mobilized by any change in motion), c= speed of motion of the photons in the gravitational context that makes the reference space.
From this equation, it follows that it takes a lot of energy to obtain a small amount of matter: 1 gr of matter would be equivalent to 25 million kWh. Black holes therefore represent an absolutely phenomenal amount of energy. Sometimes, the matter releases "accidentally" some of this energy, during nuclear reactions by fission (core division) or fusion (heavier cores assembly). Signals, consisting in the furtive apparition of antiparticles, can be detected on this occasion. The annihilation of symmetrical particles, incidentally, confronted with these nuclear reactions, then generate high-energy radiation (gamma or X waves). **When a particle meets its antiparticle, any symmetry status disappears and their masses "evaporate". This phenomenon is the opposite of the process of creation of matter by radiative entanglement**. It produces mainly photons whose flux represents electromagnetic radiation. Incidentally this type of confrontation is generally accompanied by the appearance of low-energy particles, dictated by the inevitable principle of energy conservation and load balancing.
But the reverse process that deconstructs the Universe by regrouping matter, no possible return, prevails over any other evolutionary trend. This concentration phase was particularly active in the early Universe.

By allowing fermions to communicate and interact, the integer spin particles (photons and other bosons prescribed in the standard model) could be the vectors of unrecognized interactions between quantum symmetries. These particles (or gauge bosons) would play somehow the "wall passes". In symmetry, we would find logically anti-particles and also anti-nucleons.
It may be thought that antimolecules are not modelled to the same symmetry given a chirality likely to affect the atomic distribution.
It is not only the charge that distinguishes the particle from the anti-particle and puts them in symmetry but above all the imprint of a certain chirality in an imaginary time that does not exist for us who know only relative time. This imaginary time has no temporal direction and is in some way like imaginary numbers that we cannot place in the scale of magnitude of numbers whether positive or negative. This unrecognized imaginary time can be interpreted as a «temporal disparity» between two potentially

symmetrical quantum states. Such a spatiotemporal chirality that connects the notions of symmetry and orientation, makes the binary system of universe in quantum symmetry metastable and discreet and teaches the evolution of it. It explains our embarrassment in apprehending this quantum property of quarks and leptons, what is spin and that is to seem to give them a sense of rotation. This apparent rotation of the electric charge (or magnetic moment) of particles of matter is an image that reinforces our perception of a macroscopic world. But this intrinsic dynamic to the particle has no concrete equivalence for us. The reason is that the internal movements of the entangled waves that make the particle and that seem to determine its spin and helicity, cannot be described by reference to Einstein's relativistic space. The spin would represent the rendering of the associated and intrinsic movements of waves entangled in "stationary packets", representative here of a particle of matter. These waves thus confined would give the particle of matter a certain angular moment. Spin 1 photon, without mass or charge, has polarization properties. These properties mean that EMW are brought to play the role of state vector, carrier of energy between particles of matter thus performing quantum electrodynamics, but also between particles and antiparticles. The photon somehow arbitrates interactions by allowing energy transfers between charge-bearing particles that unlike photons cannot simultaneously present an identical quantum state in the same system. Most fermions have a half-whole spin. This means that for the same energy level, they must be distinguished by a spin of opposite "direction" except to make matter unstable.
Spin is not a property that can fit within the framework of classical geometry. It can be assumed that an unrecognized property of the spin would be, by its dynamic effects, to endow most of the particles with an electric charge. The constitution of matter could not be achieved if all the particles were deprived of charge (case of neutrinos). This fundamental property of the spin would suffice to explain the existence of antiparticles of the same spin, by validating the idea of quantum symmetry. Because of the spin combinations, the magnetic spin properties of a composite particle are less discernible than those of the elementary particles it integrates.

The spin of a particle without being mechanical, defines the angular moments and therefore the magnetic field of it. Spin helps to understand the chemical bonds between atoms and between molecules that do not have a spin as such in the given sense for the particle. **Spin and electric charge would be to**

quantum mechanics what the gravitation and the rotation of the bodies are at the macroscopic scale.

In quantum mechanics, we are reduced to reasoning in terms of the density of mass and of probability of presence of particles when we try to locate them in space and to circumscribe their behaviour in time. Here lies our difficulty in making a smooth transition between the quantum "dimension" and our macroscopic reality. Our analyses are disturbed by this scale shift which requires us, with regard to particles, to leave behind a logic built on a need for spatial localization and for travel tracing.
To make matters worse, we are also unable to recognize antimatter because we belong to its symmetry (anti-antimatter). But if this symmetry were not so discreet in differentiated times justifying « parallel » spaces, we would not be here to talk about it! The only clue at our disposal is that we perceive it, on a macroscopic scale, by the unexplained gravitational effects it would generate (see chap. XIV about the black matter) and occasionally during certain nuclear interactions.

In Einstein's theory, relativity leads to combining any measure of time with measures of distance. But things may not be done as much in parallel as they seem because the time in the Universe does not stop «slowing» and the space to lose energy of the vacuum (a relativity that continues to evolve). On the other hand, the two symmetries are supposed to interact in a time-sharing context that is not ours and in dimensions of space whose nesting remains unobservable.

Electromagnetic decoupling represents a decisive period in the early days of our Universe when the primordial energy changes shape by distinguishing photons, neutrinos, first quarks and electrons for the most part. At the same time, from these particles we see the formation of the first light atomic nuclei (mainly hydrogen and helium). The first stars will produce the heaviest nuclei, some of which are particularly unstable and will be rebuilt differently by nuclear reactions. As space is less densely crowded, free photons and charged particles encounter fewer and fewer obstacles.

During the first few billion years (knowing that here the year should not be considered as a unit of time immutable), the first black holes, with their particularly abundant accretion disk, would have been revealed particularly gluttons for energy. Quasars, mainly observable in the distant past, report young galaxies that populated the Universe in earlier times. They gather around a particularly active black hole a large quantity of matter dispersed more diffuse than today in the form of gases and young star bodies in formation. The neutral hydrogen clouds are heated and ionized before collapsing as they approach the black hole of these galaxies, making them particularly bright. The quasars we see in deep space would result from the accretion of matter in the particularly diffuse and equally dispersed state that occupied most of space in the past. These clouds, which are mainly made of hydrogen and less of helium, will also feed the stars at the beginning of the formation. The heavy elements, products of stellar nuclear interactions were thus quite little present except undoubtedly, those produced during supernovae, neutron star encounters or absorption by a black hole. These quasars, sweeping in their movements a space cluttered with free particles, young stars and various objects, could quickly accumulate a phenomenal amount of matter. This explains why their size is, for many of these observed quasars, considerable and their environment poor in stars.

Since then, the average temperature of our Universe has continued to fall at a rate that continues to slow. These quasars, ghosts of a past time, observable in the distance, give an image distorted for reasons of remoteness of what were the galaxies of yesteryear in formation. These, after densification of a good part of their star fuel and proximity gas, will lose activity. They will become elliptical galaxies such as those observables in our neighbourhood, with a considerable gravitational force but deprived since, of an abundance of matter now unstructured in the heart of a super-massive central black hole. The elliptical galaxies appear to be Sparsely populated by hydrogen-rich regions. If they have had time to transform these clouds of ionized gas into stars, this is not the case of spiral or irregular galaxies. Distant galaxies are more spiral galaxies of the past. However, it is difficult to make a formal observation of this if we consider that the observable part of our Universe represents little in relation to its whole. Moreover, the age of our Universe is not really established and to predict the lifetime of our Universe, remains currently in the domain of speculation.

<u>What to remember if we consider globally the Universe in its evolution:</u>

- **c** can only be a constantly evolving, in a protean gravitation repository with an increasingly depressed space. **c** proved correlated with the age of the Universe.
- **m** in each quantum symmetry of the Universe, would not be immeasurable.
- **E** does not vary quantitatively. The primordial kinetic energy changes shape. It becomes potential of mass by creating with each atom a micro universe animated by vibrations, oscillations, mutations, exchanges described mainly by reference to what we call elementary particles. But, the conservation of energy in the Universe does not seem to mean the conservation of the amount of motion if we consider the capture of kinetic movements by the black holes and the presumed absence of movement within them. In the Universe on any scale, we place ourselves, nothing is static. Space/time can then be understood as the contextual framework which makes that any variation of movement aims to bring together in an undifferentiated state, kinetic energy and mass energy within black holes. The energy is globally conserved in one form or another, either thermal, mechanical, radiant or, to finish, in a cold state, without significant mass and presumed radiative of which we know nothing, sealed in the heart of the black holes.

A composite particle has properties distinct from those of the elementary particles that make it up. Similarly, the molecule reveals its own properties, different from those of the atoms that compose it. More generally, stellar bodies exert a gravitational hold that we cannot in the first approach relate to the nature of interactions between elementary particles. Here lies the difficulty of constructing the link between the quantum mechanics and the phenomena observed at the macroscopic scale. No doubt, we are embarrassed also by this dualism which requires us to prefer sometimes the corpuscular mode, sometimes the wave mode.
A massive body represents a system or entanglement of entangled wave packets through time and space. On the other hand, the elementary particle taken alone becomes an entity made of indissolubly mixed waves, not localizable and escapes the relative time we know. The misnamed particle seems then potentially everywhere. For the observer deprived of such a gift of ubiquity, the particle can be logically located only where our gaze envisions it to be. It then stands out, according to our standard model, by a predicted state of all possible states.

Bring back the matter, whatever the scale considered, to wave functions, would however allow us to gain in coherence and allow a less compartmentalized approach. This would probably lead to a review of our standard cosmological model in its very foundations. In theory, this is conceivable, but is it intellectually possible? In this logic where a certain corpuscular vision of the energies that make up our Universe is set aside; it would then become conceivable to better understand what is involved in the superposition of states in quantum physics. The superposition of states that is not limited to 2 states (excited or not), makes that particles and antiparticles would have, in theory, a same shared potential of possible quantum states. This is also to agree that particles and antiparticles cannot pool these imperfectly shared states because of a significant chirality of non-synchronized temporalities.

The notion of quantum superposition is derived from that of wave function that it reinforces. It implies that a same particle is likely to have simultaneously several positions as several states. This interpretation of state superimposition in quantum mechanics is contrary to our most elementary common sense. Indeed, we have the impression that a particle can be localized according to the trajectory it lets observe. It is not the same if we go back to the idea that a particle considered for convenience as a corpuscle even if not directly observable, is first and foremost a packet of waves in an “complete space” (with reference to the Hilbert space). The relativity thus freed of the corpuscular aspect or reference to mass, should therefore accommodate simultaneous distant present.

A particle could be described as a node of waves in vibration, without effective use of space because without measurable dimension. We come to think that the particles are part of a more fundamental context of uncertainty in which locality and separability, as Niels Bohr had anticipated, depend solely on the analysis of the observer and the means employed by him.

Spatial positioning and long-term displacement are essential to describe what we visualize or feel. Is it the same for what tends towards the infinitely small as towards the infinitely large and becomes not directly observable? In quantum physics, it seems that we must ignore these two frames of reference that are space and time. However, it is on these two indissociable notions which are not absolute and make the relativity that our logic is based in relation to a privileged vision of a macroscopic world. Relativity is not fundamentally quantum in the sense that it cannot to be considered as related to an indwelling property of the particle. This one begins to manifest itself with the measurements in units of physical quantities. It follows that, from probabilistic at the scale of the components of the atom, the measurements become relativistic and predictable at the macro scale.

The question that seems to prevail over all others is: where does time begin and where does it end?

- o We can assume that it began with our Universe, in the wake of the Big Bang.
- o We can imagine that it stops with the MMBH heralds the final collapse.
- o One would be tempted to say also that in any wave packet, taken under the term particle, time is virtually stationary.
- o Considering, however, that without reference to time, we would be unable to transcribe the interactions that prescribe the existence of these particles.

If time does not exist for elementary particles, how in quantum mechanics, to distinguish causes and effects, how to evaluate direction and speed of displacement, how to locate in a single precise point? Since the time of the precursors in quantum physics such as Einstein, Bohr, Heidelberg… this question has continued to divide scientists. Logically, we would understand that we have to get out of a framework in which we fit body and mind and that is that of space/time. This 4-dimensional mathematical representation makes context for the constructed matter that is so familiar to us. We understand the difficulty of the exercise. This explains why we are not able to describe this quantum problem other than in terms of probability or randomness, which ultimately amounts to predicting on hypotheses.

We might therefore think that time is a matter of scale and begins to manifest with the atom. It then makes sense with electromagnetic interactions and other force interactions that modify the structure of the built matter.
How to reconcile a classical relativistic physics describing in terms of space and time, with a quantum mechanics whose dematerialized components seem detached from any spatiotemporal reference? At this scale, we even doubt the order to be given to events that are too minimalist. This difficulty inspired the principle of quantum indeterminism issued by Max Born. Classical physics

leads us to approach a quantum mechanics that is obviously counterintuitive but with which it is necessarily related.
Faced with disconcerting paradoxes and hypotheses that were still recently unacceptable, we are now reasoning, ever more deeply in the abstract. The notion of virtual, although particularly confusing, seems to open the door to new interpretations.

The wave/corpuscle duality is indicative of the difficulty in thinking the physics of the infinitely small, in terms of wave packets for mass particles and as electromagnetic fields for free EMW. Perhaps we should banish from our standard model the notions of mass, density, or even of charge, all data in accordance with the idea of corpuscle in an advantageously tangible representation. Mass and charge would then only be an artifice; a mathematical shortcut allowing to quantify and locate a certain amount of energy as explicate in the simplified equation of Einstein: m=E/c2.

As for the photon, this would amount to considering it, not as an extremely small object, but rather as a certain proportion of purely kinetic energy, quantifiable essentially as part of energy transfers with the electron cloud of the atom. This corpuscular coating of the photon nevertheless allows us to match certain observed phenomena with measurements given in frequencies and amplitudes of wave.

In the early days of the Universe, some of this purely primordial kinetic energy became particularized by breaking the initial homogeneity and creating irregularities in a smooth and cool plasma where time and space had no real meaning. These radiative entanglements, revealing a broken symmetry, have become the elementary particles of our standard model. The background electromagnetic radiation is then, no longer uniform and shows successive variations in amplitude, called wavelengths. The appearance of these wave frequencies would result from numerous interactions over time with some primordial radiation that has since been configured as mass particles. This means that the wave frequencies dependent on the occupation of the propagation medium, have always ceased to evolve by transfers of energy and information with elementary particles. These appear to be able to diffract like light but cannot propagate in open field as EMW.

The idea of mass is there to allow us to incorporate these waves into our reality by dressing them with characteristics related to an environment felt in terms of movement, heat, compactness, color, volume, odor… Our cognitive functions are designed to interpret our environment as close as possible to our needs. This is how we approximate a reality whose real foundations we ignore despite the relatively advanced state of our knowledge and of the new technologies?
It is so with the electron which has nothing of a point in space although we describe it as such. If we attribute a mass to the electron, it is to quantify and distinguish by the use of mathematics, the potential energy it represents and the kinetic energy that determines its movement. If mass is understood as the signature of a wave packet, would it not be more appropriate for these electron clouds, to speak of flux or energy field conditioned by the presence of a central energy field (the nucleons of the atomic nucleus). These two closely correlated fields and which exist only according to each other, prescribe the existence of contrary charges. **But wouldn't this idea of charge attached to that of energy/mass be the transposition to the recognized matter of a certain unrecognized symmetry?**

The so-called mass particles prove not to be able to reach the speed of light in their movements. In reality, the intricate waves that make it a sustainable system, interact in a closed environment empty free space but not isolated. Their internal movements escape relativity and exonerate themselves from any reference to the speed of light. Speaking of electrons in the sense of particles that can be isolated, leads to doing the same with EMW. The photon, which has become a corpuscle for convenience, then represents logically, the indivisible unity of energy to be transferred to an electron.

From the above, it can be argued that the electronic "cloud" of an atom is more fundamentally a shared beam of wave packets orbiting around an aggregate more or less stable, complex wave packets representing the nucleus. The electron field thus traps the atomic nucleus as it would a containment vacuum chamber. This vector field of equilibrium calling for an explanation, the idea of contrary charges and polarities was considered the most plausible. It is confirmed by a number of applications in a logic implicitly consistent with our reality. However, we cannot help but draw a parallel with the gravitational force that attracts the bodies until sometimes placing them in orbit. However, at this macro scale, gravitational force seems foreign to the effects of charge. But this does not exclude about it that electromagnetism and gravitation can find their foundation in a common process.

Indeed, an astral body is nothing but a complex and open system of electromagnetic interactions. However, the electromagnetic waves follow the curvature of space-time and modify it during their interaction with matter. From a distant point of view that is ours, we mainly see a expansion of the so-called empty space. This is due to the fact that we assimilate the time of the observed deep space, to our local time. The more massive a body is, the more it distorts space-time. The gravitational effects would thus result from a set of mixed interactions between charged elementary particles. The globally neutral charge bodies emit magnetic fields whose intensity depends on their mass and kinetic energy. Like the tip of the iceberg, these electromagnetic force fields would therefore be directly associated with the gravitational effects of bodies. This leads to consider that the gravitational force would be of quantum origin (see chap. XVIII).

How to explain the fact that this belt of wave packets (electrons) «vibrating» in a closed circuit imprisons it by isolating it, another system of wave's packets sharing their properties within the atomic nucleus? By endowing these waves packets perceived as corpuscles with an electric charge, we give ourselves the means to explain what we understand as a balance of forces. This artifice then satisfies the understanding of a quantum mechanics that predicts the emergence of time and space at supra-atomic scale.

The notion of mass allied to that of particle makes it possible to model, in mathematical form, what would be basically only intensely intricate waves packets in interaction with the EMW fields that « furnish » the empty space.

To say that any form of energy considered corresponds to a recognized state between an infinity of possible states, would mean that there could be an infinity of potential states of universe. The multiverse Cosmos then becomes a virtual and mismatched mosaic of binary systems of universe in quantum symmetry. By realizing the conditions of observation, we are led to presuppose quantum states in relation to the objective sought and conforming to the image we have of our Universe.

In other words, we see, and still more often indirectly, only what we are given to see: a reality in conformity with our very special status living organism concerned to discover a truth that is so inaccessible to him.

XI A mysterious absence: The Antimatter

(Really missing or simply hidden from our eyes?)

The heart of the stars conceals an intense activity that is revealed to us by the heat released and by the received radiation. Heat and brightness are two recognizable facets of the same phenomenon that we understand as the fusion of light atoms (mainly hydrogen and helium at the beginning of the Universe) or nuclear fission of heavier atoms.
Nuclear reactions could be interpreted as the result of close as well as discreet exchanges between quantum symmetries. We can only perceive its effects by the impact they have on our symmetry (that of the particles of matter) and the incidental, brief and punctual appearance of antiparticles.

What can lead us to believe in the existence of a pair of Universes of quantum symmetry?

- Our gaze rejects the existence of a symmetry of the matter. But this observation raises more questions than it eludes.
- The existence of a quantum symmetry capable of abrogating time and space would explain why a Universe can open and disappear in a more general virtual context where everything could be interpreted as infinite and timeless. Which excludes the idea of nothingness as absence of everything.
- A binary system of universes in quantum symmetry makes it possible to imagine a shared universal or imaginary temporality different from our relative time.
- It would lack matter (the hypothetical dark matter) and also a form of energy not perceptible (called dark energy). Why not look on the antimatter side after correcting our current estimates (see chap. XII on corrections)?
- Temperature, pressure, and density that give the measurement of the entropy of a system, characterize all forms of energy. These indicators form the main thread of a story that we can reconstruct by accepting the concept of Multiverse Cosmos.
- The space/time that makes the fabric of our observable universe cannot at the present stage of the evolution of our Universe, to be confused with the one that represents its opposite symmetry. These inseparable spaces/time would evolve in staggered, superimposed or even parallel dimensions and would be in a kind of permanent osmosis.

What cannot be seen, could perhaps be conceived by extrapolating, provided that the idea remains consistent with number of observations considered to be well established. This also presupposes that relativity should not be called into question more than necessary the relativity promoted by Einstein and the tree structure of forces and particles on which our standard model is based. The latter must remain, in all cases, a basis for reflection and a point of support for future advances through a priori irreverent hypotheses (this point is more fully developed in chap. XXI).
The two symmetrical states of the same binary system of universes, would not really stack on each other but would fit imperfectly into each other as many repositories as particles and antiparticles. **These strata of energy in quantum symmetry, interpenetrate each other without really managing to merge in the current state of evolution of our Universe.** Particles and antiparticles share complementary states, in a conjunctural time, not discernible and evolve almost parallel (almost because of chirality) such ampliative copies.

Antiparticles suggesting a dimension other than that which makes our reality! Is it more counterintuitive and refractory to our cognitive abilities than the idea of decoherence or those of non-locality, quantum correlation, Big-bang from nothing, Universe expansion finite but without edge, strings in vibration, dark matter, dark energy, loop quantum gravitation…? **Certainly, this cosmology which predicts here the discrete existence of antimatter in quantity equal to matter, remains theoretical but it proposes constructive responses to a patched standard model and lacking coherence. We model what we discover from increasingly efficient observation tools. But by sufficiency, we forget too easily that this model is also partly based on thought exercises, hypotheses and postulates concerning on an infinitely small. However, on this level of scale, everything escapes direct observation and experimental research reaches its limits. Mathematical reasoning no longer becomes complex and abstract. We are in a kind of feedback loop (when the answers lead to new questions or when advances call into question certain achievements). Indeed, how can we be sure that the terms of our equations and therefore the answers they induce, are appropriate in our research on the unrecognized foundations of our Universe? These mathematical constructions refer to a physics built from what we consider as the one and only possible reality. Now we know that our reality is only an interpretation of what our observer condition does not allow us to see**

otherwise. This excess of subjectivity, which is due to our very particular status, actually suggests to us a cosmological model supported as mentioned above, in part of conventions and postulates. In fact, we tend to hide our inability to immerse ourselves further in what might be the foundations of our Universe. This form of denial nevertheless allows us to make significant progress which, finally, let us hope to one next day be able to understand what makes our raison d'être.

How can we conceive of a parallel «dimension», without physical representation for us and which is supposed to be in symmetry of what makes our reality? One may ask whether we are able to do so because our thinking is built around and for a relativistic environment made of time and space in close relation to our experience. We then understand that describing mechanics of the infinitely small and what is our Universe in its quantum symmetry is not today really within our reach. But perhaps we can try to do that by analogy. This remains an image-based approach in the absence of being able to proceed otherwise.

We could build on the idea of possible changes in energy state. For this, let us imagine that the massive elementary particles, considered as wave packets without occupying space, have the property during the displacements that we attribute to them without necessarily understanding its nature (by ignoring phenomena such as non- locality or the EPR paradox) to move from the state of particle to that of antiparticle. Such a phenomenon then assumed immanent to any massive particle, would amount to an overlay of two possible states in a shared symmetry that, by nature, we are not predisposed to discern. These quantum states would be potentially alternative. Of course, this is only a subterfuge of thought but it avoids considering that a particle is at the same time its own antiparticle.

Only an extreme density inducing the absence of interstitial space (and therefore time), would result in these two states merging in symmetry; the final collapse of the TNMM in a cooled Universe, should satisfy this condition.

If we assume that a binary system of universes in quantum symmetry ends as it began, we can interpret this as a kind of return to the past. We could then consider that these two states share a time that is not really what we perceive. This time, a sort of universal time, as opposed to relativistic time, would not distinguish between the past and the future and would thus not have the value that we give it in relation to the chronology of events. **A temporality of**

permanent presents: this fit well with the concept of virtual forces and virtual particles! This sharing of an imaginary time would explain the role of photons and neutrinos without significant mass, both without charge and which appear to disappear and then reappear. These virtual particles - in the sense that they have no other reality than to help the understanding of observed phenomena - would be relays of connections not recognized as such, between two symmetrical states.

Currently, the most widely shared idea is to consider that the antimatter would have been confronted with the matter in the period following the Big Bang. This would explain why our Universe seems almost devoid of antimatter. But although this is difficult to accept, it would also mean that matter and antimatter were not in equal quantity to the origin. The idea of chiral symmetry developed here, responds to this imbalance without implying that the matter could be preponderant. This dissenting explanation that seems to shift the issues, considers that our ability to observe remains limited even if our gaze is becoming more and more inquisitive.

Indeed, we can perfectly say to ourselves that if we do not discern antimatter, it is because it is not accessible to us for direct observation. The matter that dresses our reality is, in a way, screen. We see only it, so to speak. The gravitational effect of antimatter (assimilated here to dark matter) would therefore occur on bodies and systems of consequent mass, mainly galaxies and galactic clusters. Antimatter concentrations would participate thus to the gravitational "watchmaking" of bodies significantly disrupting the orbits and trajectories of the most massive stars, stellar black holes and galactic systems.

If antimatter is fleeting in nuclear reactions that modify ordinary matter, it is not revealed either by nuclear interactions of its own, or by any form of strong interaction, nor through electromagnetic effects that it would produce. Yet unexplained gravitational effects seem induce its presence as discreet as it is.

We know that particles of the same charge repel. This repulsion would therefore intervene, in the same way, between antiparticles of the same charge. When antimatter manifests itself, it is stealthily and stealthily, in the form of an antiparticle in symmetry of a particle of the same type but of opposite quantum numbers.

General relativity describes the gravitational effects on space and time of the locally densified baryonic matter (the ordinary matter that makes up the observable universe). **Probably the same is true for antimatter that would**

possess its own general relativity in a chiral space/time to that representative of matter.
This would make it possible to explain that we are not, except in certain cases, in a position to observe antimatter, a candidate for dark matter. Let us recall that in astrophysics, some advanced theories often lead to mention hidden dimensions. To predict other dimensions for antimatter is no more inconceivable than to evolve the one-dimensional objects of string theory in 10 or 11 dimensions or to associate a fifth dimension with the infinitely small (Kaluza).

Open to both symmetries, the photons would represent the carriers of energy, necessary for osmotic exchanges between matter and antimatter. Carriers of energy without mass or charge, they would be divided between quantum symmetries in the context of discrete interactions.

The EMW interfere with each other and interact by diffraction, refraction, absorption and emission by the matter. Why don't we observe these phenomena with antimatter? Perhaps it is necessary to consider that a form of quantum entanglement of photons (corpuscular representation of EMW) allow nonlocal interactions (Bell's theorem) in a dimension specific to antimatter. This as transparent, would thus escape our detection. Non-locality is a recent concept that leads us to believe that particles and antiparticles could be more or less inextricably linked although they do not share the same space and temporality. Some gravitational effects should support the idea of antimatter in discrete interaction with matter. But since it was not possible to observe diffraction or refraction of light by the antimatter, it seemed simpler to imagine an invisible, undetectable adjuvant with a substantial mass, called dark matter.
We are not able to perceive the EMW interacting with an unobservable antimatter, in a time that we do not share. Let us not forget that the Universe only discovers us as an indeterminate portion, limited to an observable perimeter.

Non-selectively, would we not, without knowing it, shared in the two dimensions?
Everything interacts with everything in each symmetry and each symmetry can only react "echoing" the other.
In the constructed matter, atoms exchange electrons thus constructing molecules by chemical bond. Antielectrons and antiatoms have likely the same

type of interaction which does not mean that there is a mirror effect as in a perfect symmetry (up/down, right/left, place/reverse, simultaneous coupling of events). Antimatter particles, although not directly observable, would be logically of same mass, of the same spin but of opposite quantum numbers and would exert gravitational effects on the matter with which it is indissolubly paired. The Universe would therefore have 2 coupled Riemannian metrics.

This «porosity» between quantum symmetries would therefore allow the coexistence of complementary wave functions (the probability amplitude becomes thus devoid of value) of which we make an intelligible representation in the form of symmetrical fermions.

Waves and corpuscles represent 2 observational modes and 2 mathematical processes to process quantum objects knowing that:
- the corpuscles show traceable positions unlike unlocatable waves
- the corpuscles move in curved trajectories while the waves propagate simultaneously circularly on all fronts.
- the corpuscles cannot be diffracted and interfere like the waves.

The wave function allows to blur this duality but it leads to accept the idea that what affects quantum mechanics can only be probabilistic. The wave function which is a purely mathematical demonstration, confers a position and displacement to a particle in mode of statistics, considering a superposition of potential states specific to any particle. Being supposed to consider all the potential states of a particle, the wave function is above all statistical.

A wave function is defined as a cloud of probabilities. But probabilities do not mean inconsistency or random conjunctures. it would be, in an unequally shared time, discrete arbitrations, carried out by particles without mass (photons and other hypothetical bosons) or little consequent mass (such as neutrinos) between two «staggered» symmetries. For anti-matter (which here joins dark matter), it would be more appropriate to speak of fermions of opposite symmetry than particles of opposite charge. The balance of charges is realized between fermions of different nature and of different charge and which above all belong to the same quantum symmetry (see table of elementary particles). Thus, a neutron (2 quarks down + 1 quarks up) differs intrinsically from the antineutron (2 antiquarks down + 1 antiquarks up) although both are charge neutral.

Can we exclude that the presence of unobservable but potentially interacting antiparticles with their partner particles is sufficient to explain the seemingly random nature of the path taken by the particles in Young's double-slit experiment? The antiparticle confronted to an observation device that ignores it would show the way to its partner particle. This could explain the "uncertainty" of measurements in quantum mechanics and justify their statistical formalism (Schrödinger equation). Quantum superposition would be our way of interpreting certain discrete effects due to antiparticle and which escape observation (if not indirectly during nuclear reactions). This is complicated by the fact that we consider the inevitable interactions between the observed subject, the observer and the observation tools. If the antiparticle intervenes in determining the trajectory of its partner or not particle, it becomes difficult to speak of a quantum trajectory that is fundamentally random or indeterminate. This point would lead to enlighten in part a problematic incompatibility between quantum mechanics and gravitation.
Perhaps not the best way to explain the quantum symmetry of the Universe would be to carry out the following experiment:
Let us use 2 slides representing the same landscape in black and white without half-hue. One slide is in black on a white background, the other in white on a black background. By projecting them together from a single projector and superimposing them on a single screen, the eye sees that the landscape has disappeared. Everything just went black.
Let us now use 1 projector per slide and always a single screen. The images are superimposed. But the illuminated part of each slide covers the dark part of the other. We see that the landscape has also disappeared, but this time the screen is white with light.
We can deduct from this that, in both cases, the projection in superposition of this same landscape in inversion of hue, does not allow to imagine the stratagem of the inverted slides if it is hidden from us. This optical effect is our vision of a reality (a single slide) that belongs only to us and does not consider an ignored context (the inverted slide).

Represented as an asymmetric superposition of multiscalar fields, in constant evolution, matter and antimatter will not be able to meet before the almost-programmed end of the deconstruction process of our universe. Unlike the particle that lets itself be observed (always indirectly) when of interactions, by revealing to us a «chosen» state, the antiparticle in a dimension that is its own, remains inaccessible to any observation even indirectly. However, when it manifests itself (usually in the form of particle/antiparticle pairs), the antiparticle reveals to us in an extremely stealthy way a possible state in symmetry of that of the sister particle.

Presumed to have been originally created in equal quantities to matter, antimatter would therefore be decisive in the problem of the Universe. In the eyes of the observer - that we are- the antimatter seems by its apparent absence, to ignore the matter and the electromagnetic radiation of backgrounds that make our Universe discernible. The hidden secret of the universe would be in antimatter!

The observer because he is consubstantial with matter makes this as a tangible contexture, its only possible reality. Therefore, the antimatter is particularly discreet to the point of suggesting that it has mostly disappeared. A certain asymmetry CP would like to justify the predominance in our eyes, matter over antimatter. Unfortunately, it is far from enough to explain an alleged antimatter deficiency.

Everything seems to indicate that antimatter can be conceived only in the quantum form of elusive wave packages whose evolution would not be in perfect symmetry of the matter at the atomic scale. Assigning an electric charge contrary to the antimatter particle is an accommodating shortcut to imagine a quantum anti-entity that is the basis of matter/antimatter symmetry. It is also consistent with the idea that particles and antiparticles have the ability to interact with each other by annihilation or pair creation, in the context of certain nuclear reactions (disintegration β), in the vicinity of neutron stars or of black holes or under the effect of a powerful magnetic field (especially that of the earth).

Particles of matter cannot annihilate each other because they do not have a symmetry of properties or quantum number. The same is certainly true of the antiparticles between them. For the same reason particles and antiparticles that do not possess the same properties of mass, spin, while being opposite quantum numbers would not fulfill the conditions for annihilation. However, annihilation by removing particles and antiparticles from the “quantum landscape” retains the initial energy of the particles involved in the form of quanta with multiple polarization states (photons).

How to explain quantum entanglement for particles of the same nature?

Would it not be a manifestation, a mirror effect of the quantum correlation between particles and antiparticles? This would help design a status for antimatter. For example:

- Virtual particle without symmetry, the photon by dividing, produces photons that remain entangled.
- Without charge and almost without mass, the electronic neutrino should do the same, probably to a lesser extent.
- Fundamental particle whose mass and speed depend on the energy transferred by photons, the electron has shown that it is likely to entangle, possibly because of its permanent interactions with photons.

This form of remote interaction that takes place outside time would in fact be the representation in our space-time or nothing is really simultaneous**, shared correlations in a «deeper dimension», representative of a fundamentally quantum Universe and which we cannot recognize as such.** Indeed, by concealing by decoherence effect, the superposition of quantum states to the observer that we are, our space/ time does not allow us to glimpse behind a vision both reductive and global of our Universe, this concept of a complete fundamental state that escapes time and space as we understand them. Paradoxically, the superposition of states and the quantum correlation it reveals make quantum mechanics an out-of-the-box physics, free from both spatial and temporal dimensions.

Quantum entanglement does not seem to extend to other elementary particles such as quarks which, in strong interactions, make up the atomic nucleus and lose their individuality in some way. For composite particles as for the atom, we cannot speak of non-local entanglement because of properties closely shared internally and which give them properties well distinct from those of its components.
The quantum entanglement is such a counterintuitive phenomenon that it is extremely difficult for us to imagine it. Yet, this recent discovery is a key which seems to open on new advances or interpretations in quantum exploration. Indeed, entangled photons are difficult to locate at the same time. They realize a linked system that as a whole, escapes our field of observation. Therefore, and although they share correlated quantum states, they remain dissociated for the observer we are. This «narrowness» of view means that we are in the ignorance of the interactions between entangled photons outside the field of

observation and antiparticles that cannot share the same spatio-temporal dimension as matter. Quantum entanglement would make the photoelectric effects opaque to our eyes, the formation of pairs and diffusion phenomena resulting from interactions between distant entangled photons and an antimatter that we are inherently unable to perceive. **That matter/antimatter chirality escapes our gaze, could be explained by the fact that quantum entanglement is not satisfied with a restricted field of observation which obscures the interactions between symmetries.**

If we had a simultaneous right of view on distant entangled particles that do not share the same referential, it would be otherwise.

Even if we manage to establish Bell correlations for spin states between atoms under very special conditions (preparation of a helium condensate during experiments requiring a temperature close to absolute zero), atoms, molecules and especially macroscopic bodies seem to exclude themselves naturally from the quantum entanglement. This is due to the fact that it is the constructed matter which configures space as we understand it, whereas the elementary particle does not seem to give way, in itself, to a vacuum. Out of direct observation range, it does not reveal any internal phenomena or interactions. One would think that its properties (flavour, spin, mass, charge, colour) are due to extrinsic phenomena.

It is difficult to speak of quantum entanglement for atoms. Only the particles of light (photons) which have the particularity of being without mass, charge and whole spin would produce, when they divide, photons correlated over time. This should remain so, especially since they will not have had to interact with mass particles. If we consider that all the photons of our Universe have the same origin and remain linked since because of their fundamental state (they are representative of the primordial energy not gravitational), the inequalities of Bell are not violated. For the light particles thus entangled, the space is somehow erased. They share an « apparent » temporality where relativity is left aside. In quantum mechanics, space becomes an uncertain data that no longer has the meaning we traditionally give it in terms of movement and location.

This leads us to draw a parallel with antimatter, which is governed by the same quantum mechanics. The antimatter would also have an « apparent » temporality but in an unrecognized space. Inaccessible to observation, antimatter would therefore be in application of an expanded principle of

non-locality, correlated in a discrete but imperfect way to its symmetry. It is also a way of defining, in relation to quantum entanglement, what is the chirality following an original break of symmetry.

To sum up, quantum symmetry (matter/antimatter) would discreetly form the basis of the dynamics of our Universe. It would be in a time virtual for us and that is not the relative, spatialized time that we know. The problem is that it takes less than that to hurt our understanding!

The above would explain certain gravitational anomalies (see chap. XIV). Ignoring antimatter has led us to imagine the presence of unknown matter and energy. But this hypothesis proposed by default lacks the beginning of a beginning of proof.

The idea of a Cosmos representative potentially of latent energy, unrevealed, without physical reality, potentially in symmetry break, has no other interest than to help build a coherent paradigm in its ins and outs. If simpler is often too simple; too much complexity sometimes makes us lose the thread and tends to lead to a dead end.
Concerning the wave/corpuscle duality, the commonly accepted position is to decree that the choice is determined by the viewpoint of the observer and his method of investigation. What appears, at first glance, to be incongruity has led to a controversial concept of wave packet reduction after measurement. A very imperfect parallel with a phenomenon that we know and explain, would allow perhaps to demystify this apparent duality.
To do this, let us make a comparison with the oceanic wave trains (it's a good idea; we're also talking about wavelengths for waves). The waves that store energy are like photon flows.
Seen from very far or from very high, the sea looks flat and we do not perceive surface movements. On the other hand, each water molecule forming the wave travels on a vertical plane, a closed loop where each crest alternates with a hollow. And here too, at the molecular level, we cannot see the surge of waves. Our field of vision cannot be limited to these two points of view.
When the sea becomes flat again, troughs and crests will level. But for the moment, a certain disorder, maintained by the marine and atmospheric currents, forbids it. The comparison, which is too imprecise, must stop there. It only brings a little water (sea) to the mill.
Indeed, the waves are supposed not to be able to be localized real-time and do not make really waves.

The quantum symmetries are potentially interconnected as by countless invisible stretched threads, allowing them to communicate. Information conveyors, photons and neutrinos would be these tense invisible threads, imaginary messengers without borders in this broken symmetry. The electronic neutrinos, which are difficult to identify, without charge and an uncertain mass, could be likened to "denatured" photons during interactions within the framework of the electroweak force.

These are chemical bonds that achieves the balance in each of the symmetries. The kinetic movements (spin, orbital, speed of movement, direction and speed of rotation) contributes to the fine-tuning of this relative stability in a space/time that keeps fluctuating by gravitational effects.

Each particle would therefore have, in symmetry, a twin particle of leptonic or baryonic number opposite and which is ignored (in a way, a reflection up/down or a left/right laterality). The antiparticles, in this way, have an opposite magnetic movement, associated with a global kinetic movement, in the opposite direction, considering the charge reversal.

These distinctive features allow us to identify and better understand certain interactions in quantum mechanics, the classical physics coming out of the subject. Like the event horizon for a black hole, the electron horizon for the atomic nucleus is a screen that attracts, absorbs or reflects quanta of light. Some seem to disappear there. Others reappear, after leaving part of their energy, by leaving the belt of electrons of the atom.

Without mass as well as charge, a quantum of light often does not have the sufficient inertia to cross the barrier of electrons and reach the nucleus. If, however, this may be the case, depending on the angle of penetration and the wave frequency, it disintegrates by beta reactivity (see interaction with the nucleus, chap. X). This intrusion has little lasting impact on the core mass. This is what makes all the difference with a black hole which keeps being fed, and and gains “weight.” Crossing its accretion zone, the black hole that is not observable directly, has everything of a quantum entity despite its size. But unlike the particle, it signals its presence by nonquantum phenomena that we perceive at the macro scale.

When a particle joins a black hole, the quantum entanglement that linked it to a same distant particle disappears. By absorbing elementary particles devoid of physical dimension and therefore not representative of occupied space, the black hole, a non-significant singularity of reserved space, is charged with energy without any real occupation of space. The space that we attribute to a black hole regardless of the amount of energy it collects, can be interpreted as a fictitious (or virtual) region of a space/time that realizes the topology of our Universe.

Under these conditions, is pressure a physical quantity likely to be retained, as for the elementary particle evokes the primordial state of matter and for the black hole, its final destination? Can we give a mass density or energy density, since quantum objects in which empty space seems to be excluded?

- The particle of mass as a packet of waves, would possess internally, all the properties of light. Now at the speed of light, the time seems to stop. Inseparable from time, the concept of space occupied for the elementary particle then loses all meaning, which would place the elementary particle at both the space/time boundary and boundary of the multiverse Cosmos.
- The black hole retains information representative of any form of energy it brings back to the primordial state. How then to speak of entropy within the black hole? Time and space no longer have the meaning that we give them in terms of location and movement.

In summary, space/time would be a state or framework of transition between the elementary particle and the black hole. We then realize the difficulty of integrating them into a cosmological model that would overflow a space-time unavoidable for the observer. This context of space/time allows nevertheless the observer he integrates to represent himself and describe the interactions between the components of matter that make his reality and realize in his eyes, the evolution of our Universe.

However, although without significant dimensions, elementary particles and black holes fit for the observer that we are, in interstellar space. Although this idea of the absence of spatial and temporal dimensions is rather counterintuitive, this is how we represent the point in geometry, without it bothers us too much. It would therefore not be their physical presence that makes them appear to us, but on an order of magnitude accessible to our observations, the effects of their interactions with built matter, this matter in the state of charge equilibrium that makes from the atom, our reality.

In a black hole the notion of particle as of boson loses all its meaning and the connecting forces (electromagnetic, weak, strong) cannot distinguish themselves as such. However, they represented 99% of the energy considered in the overall mass of the bodies absorbed by the black hole. The photons and bosons of the weak interaction dissolve somehow in this quantum singularity that is the black hole. The energy captured by a black hole is sort of on standby.

This leads in a more general context of binary system of universes in symmetry, to broaden a certain principle of conservation of energy. Our thinking is then confronted with scales of magnitude (particle-universe-cosmos) that lead to infinity. By default, of an appropriate observation framework, this idea of a cosmos “teeming” with universes without numbers and without interactions between them, tends to deviate from our ability to conceptualize. How can we imagine such a context that cannot be assimilated to a frame of reference or an environment with a common sense?

XII A standard model that does not explain everything

(And is still looking for new particles)

This development refers to the table of elementary particles which can be consulted in the annex and likely to be discussed as part of a revision of the standard model. This chapter takes for memory, the bases and components of the current astrophysics extended to quantum mechanics.

The elemental particles of **the first generation**, the lightest ones, those that build the atom: (quarks up, quarks down and electron) have the particularity of continuing. The first two realize the stable architecture of an atomic nucleus by grouping together in the form of nucleons (protons and neutrons) within the framework of a powerful attractiveness called strong force. The electronic neutrino is distinguished by the absence of charge and its low mass (see chap. XIII).

The elementary particles of **the third generation** are particularly energetic. They are the top quarks, bottom quarks, tau leptons and tau neutrinos. Once created, they break down into lighter particles of the same nature (quarks up, down, first-generation electrons and electronic neutrinos). These heavy particles seem to belong mainly to the past of the Universe.

Between these two generations of matter, which are distinguished by their energy levels, are inserted intermediate mass particles so-called **second generation**. We call them charm quarks, strange quarks, muon leptons and muon neutrinos. The hadrons in which the charm and strange are present (mesons, pawns, kaons...), are not stable and are induced to disintegrate during nuclear reactions (weak force) by generating incidentally antineutrinos (see chap. XI). We call them charm quarks, strange quarks, and muon leptons. The hadrons in which the charm and strange are present (mesons, pawns, kaons...), are not stable, for lack of a third quarks understood as necessary to ensure cohesion as in protons and neutrons. These second-generation particles are induced to disintegrate during nuclear reactions (weak force) by generating incidentally antineutrinos.

An atom unites protons and neutrons in its nucleus. These hadrons are made up of 3 quasi-virtual particles. This term quasi-virtual, since they should be considered as the elementary bricks not representative of occupied space, not directly observable and carriers of energy quanta non-breakable): quarks. The up quarks have a positive charge (charge number: +2/3) while the down quarks have a negative charge (- 1/3). Other categories of heavier quarks previously

mentioned (c, s, t, b) seem to have coexisted but would have largely disappeared, «victims» of the weak interactions.
The mass of neutrons added to the one of protons gives the atomic mass.
By convention and convenience, we mark a boundary between:

- the quantum “dimension”; that of particles, virtual to varying degrees
- the observable “world”; that of constructed baryonic matter (atoms, molecules, etc.).
- Composite particles such as protons, neutrons, mesons and also electronic clouds which make the link or intermediate step between the quantum and the observable. It is thus possible to describe, in an intelligible way, a number of phenomena by classically distinguishing the electromagnetic, weak and strong nuclear interactions.

But why 3 quarks to make a nucleon? *We could say to ourselves - this is only an image - that each of the 3 quarks represents one of the 3 dimensions needed to define space: height, width, depth (or why not, a dimension of time: past, present, future). Thus 2 quarks would be insufficient because they would then realize a flat surface and 4 quarks would not correspond to the idea of a 3D volume by definition. A triplet of quarks is therefore necessary and sufficient. One colour is arbitrarily assigned to each of the 3 quarks: blue, green and red. Curiously, it turns out that these three colors combined give white. Furthermore, this white colour, which is not really one, achieves the synthesis of all the colors of the prism associated with the different energy intensities. Obviously, it is primary (as much as these 3 colors), but we find a certain logic that is our own!*
The idea that quarks are not subject to the physical laws of relativity is that they appear to be devoid of spatial dimensions and that assigning them a "life span" does not really make practical meaning.

A proton contains 2 quarks up or 2x (+2/3) + 1 quark down or 1x (-1/3), this which gives it an overall positive charge. Its mass would be 938 MeV.
A neutron contains 1 quark up or 1x (+ 2/3)] + 2 quarks down or 2x (-1/3) giving it a neutral charge. Its mass would be 939 MeV. We thus manage to give a mathematically quantifiable appearance to the potential energy.

Protons and neutrons have almost equivalent inert masses. Although insignificant, the neutron would be a tiny bit heavier of 1 MeV: a tiny notch that would justify the existence of an electrical charge for the proton. This difference could also be decisive in the formation of atoms heavier than that of

hydrogen (the simplest) and would be then, the source of a dynamic of regrouping of matter.
A stable atom has always neutral charge. It has as many protons as electrons, the latter being charge contrary to the former.
We could say that the electron is, in a way, the equivalent of a quark down which by mutating, managed to detach itself from the atomic nucleus to build the dynamic architecture of the atom and incidentally created links with other atoms, thus contributing to the formation and the assembly of molecules.
Muons and rates, which are particles of the same kind and charge as the electron, but much more energetic, are part of the same evolutionary logic as the quasi-disappeared quarks c, t, s, b.

The photon, because it is devoid of mass, seems to ignore what is not in its direct trajectory but the latter is nevertheless affected by the gravitational deformation of space.
The result is some remarkable interactions:

- **Interactions with electrons :**

  When a photon hits an electron, it is absorbed by the latter which then passes on an orbital of higher energy or escapes the atom to which they were attached. We're talking about a photoelectric effect. Conversely, when an electron «emits» a photon, it releases a little of its energy «stored» and passes on an orbital of less energy.

  For the highly energetic gamma rays, some of the kinetic energy they represent may interact with the nucleus. The radiation not retained in this nuclear interaction is likely to pass from the state of kinetic energy to that of potential energy by producing pairs of massive particles and antiparticles, mainly electrons and positons. These latter, anti-electrons that have no place in our symmetry, will annihilate without delay by combining with nearby electrons. It is agreed to represent the energy thus temporarily moved, in the form of an entity without charge, in capacity to transport this energy: The Z boson without tomorrow and presumed with mass in relation to the amount of energy involved.

- **Interactions with atomic nuclei :**
  - When a photon with an energy of at least 10221,022 MeV (gamma ray) affects an atomic nucleus without being absorbed, this photon can be transformed, as we have just seen, into an electron/positron pair. These

two particles of opposite symmetry will then annihilate, replaced ultimately by two photons of 511 keV that will remain entangled. These will take diametrically opposed trajectories, suggesting that they would have little chance of meeting before the final deadline. The photons are thus condemned to lose energy in contact with the matter. **These mechanisms of absorption of high-frequency radiation make that with gravitational effects, the mass of the Universe (potential energy) continues to grow, while EMW (kinetic energy) continues to lose intensity. Inevitably, the future of our Universe promises to be rather dark with residual radio waves of inordinate length, unable to interact significantly with matter except by being absorbed by it under the influence of gravitational forces.**

- When a very high-energy photon is absorbed by the nucleus, the nucleus changes its configuration, giving rise to the formation of a neutron, as if a proton of the nucleus were absorbing one of the electrons of the atom concerned. It is the nuclear-photo effect.
- It can happen under certain conditions, that a proton is confronted with its antiproton. Like for the electron facing the antielectron, the energy carried by these nucleons in symmetry does not disappear. It is agreed to represent this energy thus provisionally released in the form of an entity called boson W, of mass in relation to those of the annihilated composite particles. Like the Z boson, the W boson defined as a particle-vector thus gives visibility to certain weak interactions (see chap. XVI and XXII).
- When a neutron becomes proton by beta reactivity, it is as if it transforms a quark down (-1/3) into a quark up (+2/3). To maintain a neutral charge, the atom then acquires an additional negative particle by capturing a free electron. This exchange to remain balanced will incidentally generate an electronic antineutrino, a kind of photon «configured» according to the energy context.

  This antineutrino resulting from the beta radiation produced by nuclear fusion, will bring a tiny extra mass without breaking the load parity.

Since it is considered as a wave package, the particle can no longer be described as a localizable point. Giving it a precise position in space, is incompatible with the notion of wave. The latter can at most be described in terms of probabilities. As its location becomes uncertain, any particle should logically conjugate in the plural in the form of an arbitrarily circumscribed energy field.

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Faced with a problem of dialectics, it becomes necessary to make comparisons through the image.
Also, a way of conceiving in recognized terms, the energy field of a particle would be to compare it to a bubble of influence, localizable, without delimited dimension and all the more remarkable considering its most central part in mass data. This "bubble- wave packet" would be dressed in proportions of all the colors of the rainbow, supposed to decline the information of charge, intensity, flavor, spin…. A musician would prefer to refer, no doubt, to harmonies, musical sonorities and quantities of decibels. Another feature of this energy bubble would be to be able, like the chameleon, to change its colors and merge or split itself into smaller bubbles.
The anti-bubble-energy is distinguished by «complementary or inverted» prism colors. So, to gather 2 symmetrical energy bubbles in one, would be like mixing their characteristics, to erase them and make them destroy themselves as such as 2 iridescent bubbles of soap that collide to erase them as such as 2 iridescent bubbles of soap that collide. Thus, disappear from the landscape, the colors of the rainbow, once confused.

These bubbles have nothing physical and ignore the space that represents our observation framework. To stay on this image, whether a bubble splits into several or moves, all surrounding bubbles, without remoteness limits, will feel the effects. These quantum bubbles that do not have the perception of time, would symbolize the obligatory passage or mode of access allowing to leave a binary system of universes in symmetry, by «the bottom». The quantum world would thus lead to the multiverse Cosmos.
What we might call quantum teleportation is only a process of discrete exchanges between an unrecognized right symmetry (arbitrary choice) and a left symmetry that would be ours.
This left/right symbolism in a Universe of bubbles, is only an allegory. Talking about laterality does not really make sense here.
Assimilated to knots or energy bubbles (chap. IX) or replaced by ropes, the particles nevertheless remain in any case, elusive.

We can approach them in another way, considering only the liaison forces. *The particle could thus be compared to the attachment points of links of various calibers, in a tangle of mismatched, particularly elastic chains. These links, which do not have an oblong shape, can open, assemble, stretch and close on each other, in as many interactions. The Universe then has nothing of a soap foam in expansion.*

Without physical reality, such links could, for want of a better term, be defined as “D-branes”, to use a term already used, or to mark the difference, as “links/branes”.

This concept of energy in the form of assembled links, intertwined at all levels and present in symmetry, moves us somewhat away from the standard cosmological model we have adopted. This, of course, is only one more image, but all these metaphors make it possible in an acceptable way, to dress phenomena that have no equivalent in our daily reality. Thus, we avoid resorting to the concept of wave packet or wave packet beam which is so difficult to integrate and developed here.

In the current state of our knowledge, can we imagine a rethought standard cosmological model that is anything other than a theoretical approach that cannot be fully validated by observation or experimentation?
This booklet is, in any case, part of this perspective.

XIII <u>Stealthy and exemplary of discretion</u>

(Insignificant particle that are released from borders)

Inert mass consistent with the total amount of kinetic energy of the entangled waves confined in a packet and making the particle in motion. To accelerate, a particle must acquire additional energy. This provided kinetic energy confers a greater inertial capacity on particles and change their initial trajectory.
To accelerate (in the more general sense of movement modification), therefore, is to acquire kinetic energy and we know that it takes a lot to gain any additional inertial mass. Under these conditions, how could a body acquire kinetic energy until approaching the speed of light knowing that it could not get rid of an increasing inertial mass who would only oppose any additional acceleration? Moreover, beyond a certain critical mass, a body collapses on itself. It ends up becoming, most often, a neutron star.

The lifetime of the free neutron does not exceed 15 minutes. Why, then, is a neutron star stable and why does the neutron embedded in the atomic nucleus remain attached to the nucleus (except during nuclear reactions)? We can only make the connection between the so-called strong force and the gravitational force. One answer would be to make them join by considering that these 2 forces make only one and result both, of effects of charge. Quarks + and quarks – interact between them as part of the electromagnetic force, within the atomic nucleus. It is the same, within the neutron star where the disintegrated electrons became quarks (form of reverse beta decay) ensuring the charge neutrality of the neutron star. Atoms are broken and electrons by integrating a proton and by incidentally trapping an antineutrino cause proton to become neutrons. The transformation of protons into neutrons puts an end to any nuclear reaction within the neutron star. This marks a step in the concentration camp evolution of our Universe. The relatively stable neutron star has different density levels. The pressure increases with the deepest layers, the magnetic fields persist on the surface. Most often, the neutron star is the preliminary to a local collapse that will lead, after an estimated mass greater than 10 times that of the sun, to the formation of a black hole.

Only a particle of very low mass such as neutrino can approach light velocity because it is not very sensitive to the gravitational effects by approaching bodies and the risk that it is confronted with other particles is extremely minimal.

Although located at the two extremes if we consider their masses, neutrinos and black holes have too much in common for us not to be tempted to give them a decisive place in the evolution of our Universe. The former would be likely in its primordial form to be at the origin of our present matter particles. The second would presage the final annihilation of baryonic matter. In other words, neutrinos would prove to be the first «embryonic» manifestation of matter after the Big Bang, while mega massive black holes would be the ultimate herald of the collapse of a cooled Universe at the end of evolution.

Like the photon, neutrino is likely to be a first-order vector for exchanges between quantum symmetries. The one as the other can only be observed indirectly by effects such as diffusion, diffraction, refraction and photosynthesis for EMW. Neutrinos manifest themselves mainly through the weak nuclear interactions. However, we can detect them indirectly (Cherenkov radiation) by making them interact with water molecules. These neutrinos, particles without charge, allow atoms to adjust their mass while maintaining their charge neutrality as the EMW do. They seem recover the energy transported by the photons for the part which escapes the electron during interactions (ß decay) of contact between neutrons, protons and electrons. This particle represents the loss of energy, motion and spin during beta decay. Its emission is subject to a need to preserve the initial equilibrium in this type of interaction.

A certain way of conceiving a neutrino resulting from these nuclear reactions, is to imagine it as an electron that would have lost its electrical charge by penetrating the nucleus. But perhaps it would be more legitimate to consider it as a gamma photon that would have acquired a pinch of mass but lost some of its kinetic energy in contact with a proton after it became neutron by electronic capture.

The speed of movement (kinetic energy) of neutrinos, close to the speed of light, carries most of their energy, given their insignificant mass. Like photons, neutrinos, which are apparently the most abundant particles of mass, in the Universe, have no electric charge. If they can vary in mass, they do not seem to be able to completely disappear or disintegrate. Their insignificant mass makes them very insensitive to most gravitational effects and the so-called strong nuclear force. Difficult to evaluate with precision, their mass is susceptible to variation by change of generation (also called flavour) when density and entropy of the surrounding environment requires it. They can only

be disturbed in their course by crossing particularly intense gravitational fields, which will cause them to modify their energy equivalent mass. This is how electronic neutrinos "oscillate" into muon-neutrinos which themselves can mutate into tau-neutrinos and vice versa. This may suggest a possible variety of neutrinos less stable between these 3 levels or flavours and possibly also heavier neutrinos, witnesses of the first nucleosynthesis.
It is also for this reason that the neutrino intervening under different profiles, seems elusive and for a long time was so difficult to detect in its complexity of "forms". It would seem that the neutrino is permanently in a superimposition of energy levels such that the relationship between neutrino and antineutrino could not be clearly established.
The neutrino might have the capacity to be sometimes particle, sometimes antiparticle. That it cannot be simultaneously particle and antiparticle is because all the neutrinos observed present a left helicity (which means that the projection of their spin related to the direction of their movement is always negative). Considering that any mass particle can adopt either a right or left helicity, this could mean that the right helicity absent from the observations, would be present in the quantum symmetry to that which we know and therefore that the antineutrino would be of right helicity.

The product of the disintegration of a neutron is the creation of a proton + an electron + an antineutrino. Nothing disappears completely, simply, the terms of the equation have changed.
Particles and antiparticles are supposed to be of the same spin, of equivalent mass, of opposite helicity and of opposite charge (except made of the anti-neutron, neutral composite particle that can as such, remain free of charge). **However, symmetry cannot be reduced to what seems to be too easily, an inversion of charge and helicity. It is therefore not forbidden to think that the neutrino being of neutral charge, would embrace the most appropriate quantum symmetry by accompanying the electron resulting from a nuclear interaction.**
Although they are not the most numerous, very high-energy neutrinos are produced in abundance during the most violent phenomena of thermonuclear fusion that require several million degrees. These neutrinos come from the heart of hot stars, supernovae, hypernovae and decay phenomena that occur on the horizon of black hole events. These violent reactions are accompanied by very high-energy gamma radiation. The simple combination of 2 hydrogen atoms into a deuterium atom with mutation of a proton into a neutron, can only produce low-energy neutrinos.

The fusion of neutron stars and black holes is marked by a gamma-ray burst. But no neutrino emissions could be observed, because despite their low mass, these latter cannot escape the exceptionally intense gravitational effects of the phenomenon.

In summary, as the photons neutrinos are supposed to infiltrate the 2 symmetries in a discreet way, by interacting as a particle or antiparticle, depending on the case. They participate in this way in the process of deconstruction of the Universe within the framework of nuclear reactions.

Is it possible that the particles of matter (fermions) were created as they are today in the early times of the Universe? In cosmology, it is rare for things to be so spontaneous and direct. One cannot exclude a transition process with a succession of intermediate phases that could involve neutrinos in the state of primary particles.
Minimalist package of intricate waves, the neutrino without marked symmetry of the origins of the Universe could have been the first type of massive particle emerging from the Big Bang. A number of these first-charge particles would have continued to interact with the high-energy radiation in which they bathed. Saturated with energy, a part of these neutrinos that marked the beginnings of our Universe, could have contributed to achieve what will become the charged elementary particles and their antiparticles, of our current Universe.

In this process prior to the formation of the first helium and hydrogen atoms, we can consider that the neutrinos of the past would be in a way the embryos of the quarks and electrons and their antiparticles of today. They would be the starting point for matter and antimatter. While the photon does not have remarkable symmetry, the neutrino, because of its minimal mass and charge neutrality, would conceal a quantum symmetry of its own. The neutrino is a very mysterious particle that stands out in many ways from other particles. In particular, some neutrinos noticed in the context of particularly violent phenomena such as hypernovæ, seem to possess an unusually high energy of several hundred Tev. Therefore, one can think that in the beginnings of our Universe, neutrinos could have much higher energies, of several billion of Tev. **Derived from the original plasma, these first neutrinos would then be the entangled product (the first radiative entanglements) of the insignificant wavelength photons that marked the radiative era after the Planck's wall.**

Such photons had to possess an energy that was out of proportion to that of the photons that we are given to observe today.

These particularly energetic neutrinos that marked the beginnings of our Universe and that seem to have disappeared since, could have represented the decisive phase, heralding electromagnetism and the first charged elementary particles. During this relatively short period, the newly formed neutrinos, by interacting with each other and the diffuse radiation, realize the first free charged particles (first generation of quarks and electrons). Highly energetic, these early scattered elementary particles will eventually assemble in a cooling Universe to form protons, neutrons and electron clouds. Protons and neutrons associated with their electron processions will then be able to assemble in the form of atomic nucleus thus realizing the centerpiece of matter.

The primordial nucleosynthesis marked by a drop in temperature will only generate light atoms. With their most stable isotopes, they will be mainly hydrogen atoms, a few helium atoms and a very small amount of lithium atoms. The heavier atoms will come later with stellar nucleosynthesis. The condensation of hydrogen clouds housing some elements of helium and lithium, can be done, electrostatic repulsion between nuclei being overcome by the presence of binding electrons.

These neutrinos have had to shed a large part of their energy as a result of the countless nuclear interactions between protons and neutrons and electroweak interactions that punctuated the past evolution of our Universe. The weak force, involving neutrons and neutrinos, allowed the survival of protons in quantity. The neutron (not captured by an atomic nucleus or neutron star) is destined to transform into a proton. These primary neutrinos very energetic no longer have their place, nowadays, in a table of elementary particles reduced essentially to 3 generations of fermions.

Even today, nuclear reactions emit neutrinos called «electronic» and which are less energy. But any nuclear reactions are also likely to incidentally produce heavier muon and tau neutrinos as well as «doped» electrons with no real lifetime, classified as muon and tau. By disposing of part of their energy, these massive transition leptons, of unstable magnetic moment, of second and third generation, will be called to last, in the form of light electrons known as first generation. The first-generation particles that are these light electrons, quarks up and quarks down are those that give body and relative stability to the built matter of today. This does not exclude, however, the «accidental» proliferation necessary for the general equilibrium of unstable incident structures (composite particles, atoms or molecules) known as «exotic» involving heavy particles of different generation.

No doubt, electromagnetic radiation whose wavelengths keep getting longer and frequencies falling, are they no longer able to achieve the energy transfers necessary for the charge balance between these massive particles that inhabited a nascent Universe. This evolution would explain the current atomic structure and a certain balance of charge between fermions in the baryonic Universe of today.

XIV Dark Matter and Dark Energy

(Everything would be clear if it turns out they have no purpose)

Let us recall some figures which are cornerstones and which, faced with the most recent observations, block.
The Universe would consist of:
- ✓ 68-69% dark energy of unknown nature
- ✓ 26-27% dark matter of unknown shape
- ✓ 5% identified as baryonic matter

These estimates, accepted by a large part of the scientific community, currently lead to a deadlock because the first two presumed components, which are not the least, are lacking in the direct observation.
Wouldn't our appreciation of the energies in presence indicate an approach that is both too simplistic and too restrictive, based on the belief that our Universe would be expanding on the one hand and that antimatter would have mostly disappeared on the other?

First and foremost, let us return these figures to their fair value
The raised mass of a body (baryonic matter) represents its inertial capacity. But 99% of this mass is not intrinsic to the elementary particles thus assembled. The residual quantum energy of the particles involved in the realization of more or less complex assembly modules in the framework of our standard model is then only 1%. The other 99% reside in the connecting forces and movements that provide the edification of matter. This is mainly the strong force considered here as the result of close electromagnetic interactions in a confined environment represented by the atomic nucleus in which time and space are not significant as on the scale of the built matter. Part of this 99%, is contributing also the electro low force which participates in the cohesion of atoms and the relative stability of molecules.

What we think we know about our Universe is based on what is open to our observations or deductible from them. Given certain observational anomalies, it would seem that this part that is accessible more or less directly to us represents only 5% of the content in matter and energy of it. A supposed so-called dark matter (with its energy corollary) estimated at 27% and a more than hypothetical so-called dark energy estimated at 68% are supposed to constitute the rest of the energy content of our Universe.

We can deduct from the above that taken out of any nuclear or binding interaction (the 99%), the particles considered essentially as an isolated quantum object (at rest) only represent 1% of 5% or 0.05% of the content of our Universe. But what if we abandon the hypothesis of a Universe composed essentially of mysterious dark matter and unknown dark energy?

A particle consists of a status which cannot be described in terms of density or volume of space occupancy. An elementary particle remains a virtual object even if we are led to give it, according to the needs of the observations, a degree in virtuality especially in data of mass, charge or spin. Discrete value, the spin cannot be considered as a rotation of a particle on itself. Indeed, how could a particle that has no delimited extension in space be defined in terms of intrinsic movements as we do for any macroscopic object to which we attribute spatial coordinates and an occupied volume? We cannot even define it in relation to its quantum symmetry.
The alignment of the spin specific to each type of elementary particle would result from a certain loop polarization. Rather than a rotation of the particle on itself, the spin can be defined as the intrinsic magnetic moment of a particle. It would be so, representative of the overall angular motion of the intricate waves that make up the particle of matter. Combined with orbital movements and particle displacements in close interactions, the spin helps to give to the particle, its electromagnetic properties.

What we call by convenience, a particle would be basically and intrinsically a wave packet. These are the interactions mixed within these enclosed wave systems that create the spin-like rotational rendering. But describing a wave packet is far more complex because of the evanescence of measures than describe the behavior of an entity of a corpuscular nature. This explains why it is generally preferable in quantum physics to refer to the idea of corpuscle.

The elementary particle of matter has many points in common with the black hole to which it is intended:

- Both are not bodies, in the sense of accomplished objects.
- They are neither hot nor cold.
- These energy concentrates or wave packets, designate for one (the elementary particle); the first product and evoke for the other (the black hole); the finished product in the evolution of our Universe.
- If we speak of field in the sense of potential space for interaction between

particles or black holes, neither is however representative of space even if they end by scale change to be integrated into it.

- Both are devoid of temporality even if Space and time are part of the process of deconstruction that makes time for us.

An electric charge that neutralizes itself at the scale of the atom, distinguishes the particle of matter from the black hole. This property remarkable on the quantum scale, would constitute a memory symmetry substitute of a broken symmetry. It is this electrical charge that makes the particle «volatility» in quantum mechanics and which would achieve the capture of the EMW by the massive bodies. It is therefore assumed that the electromagnetic force at a certain scale is the source of gravitational effects (see chap. XVIII).
If the particle, as a bundle of waves “folded on themselves”, does not contain free space and if at the other end of the deconstruction process a black hole excludes itself from the space/time, how to define space? One would be tempted to admit that space is only a contextual rendering necessary for our understanding of the phenomena that from the elementary particle to the black holes realize the evolution of our Universe.

- **The Dark Matter** without being able to prove its existence, is a way to explain the abnormally high speed of stars in the galaxies and that of galaxies in galactic clusters. This assumed mass which remains unaccounted for, can be justified, in part, by a more general error in the evaluation of the masses to be considered and a recognized imperfect knowledge of the effects of a gravitation whose origin seems to challenge our standard cosmological model (see chap. XIII).

Mass surveys of galaxies or their clusters added to the background of diffuse particles are supposed to give the average mass density of the Universe, although it is necessary to distinguish between dynamic mass and luminous mass. **The problem is that the addition of conventionally estimated masses in a system seems often far below the total mass evaluated from the gravitational effects of the system.**
There is no doubt that there is a relationship between the electromagnetic radiation emitted by a body and its mass, density, composition. Except that, the emissions from a black hole cannot be an indicator of the black hole’s mass, because these emissions are dependent on an accretion disc more or less active.
In any case, our measurements compile events, remains of a distant past with others of our present proximity. Do we have the tools to correct, in application

of the laws of relativity, our vision of ancient phenomena. Indeed, the image that comes to us has been distorted by the combined effects of gravity and electromagnetic fields present throughout the Universe? We might as well acknowledge that we are not really in a position to accurately evaluate the mass of the great structures and even more so, that of a Universe of which we do not know what represents the part accessible to observation.

This apparent lack of matter could be partly explained by the presence, not inventoried, of neutron stars and black holes coupled or not in binary systems, and of other bodies with little or no light, such as brown dwarfs. Can we also consider the clouds of hydrogen of low density, neutral of charge or ionized that occupy unequally the space? This can also be the case of extragalactic black holes. Isolated in an interstellar medium locally low in gas, these have a high probability of being devoid of accretion disc. They then become difficult to perceive, given “contained” gravitational effects. These, however, are expected to exhibit spatial distortions that are difficult to observe, except for observations of regions in the background. The effect of gravitational magnifying glass is extremely complex to exploit at each observation of the distance because of the presence in the fields crossed by the line of sight, of a multitude of stellar bodies. Besides the most gigantic black holes, this makes difficult the analysis of effects de loupe that would augur the presence of such black holes.

It can also be reasonably assumed that the "empty" space separating galaxy concentrations is populated by baryons and elementary particles in the state of dispersion, which makes them difficult to detect. They would participate in the mass effect and prevent the temperature considered as low as possible from falling below zero so-called absolute (-273 degrees C). The Fermi bubbles also represent a significant amount of diffuse gas and heavy molecules centred on either side on the axis of rotation of the galaxy. These bubbles likely change the «gravitational weight» of the central region thereof. In addition, there are the wandering cosmic residues known as star dust, which consist mainly of carbon and silicon. These «heavy» dusts are what are left of stars like our sun, which at the end of their lives cool down, lose their luminosity and finally eject into space their outer layer.

There is nothing to say that the mass of a black hole is proportional to its actual size, which seems to progress less quickly than its alleged mass. This possibility, emerges from two observations:

- The gravitational measure of dwarf galaxies and star-poor galaxies suggests that they have a central black hole with a particularly high mass/size ratio. These 2 types of galaxies usually have an advanced age that explains the unsuspected density of the central black hole after it phagocytized its host galaxy. Can we really determine the mass and what energy represents; a black hole so difficult to observe from simple gravitational readings? **A black hole is not a star and unlike any stellar body, the calculation of its density cannot be carried out in the conventional way. It is therefore not surprising that our observations are insufficient to determine its mass and gravitational effects. We should not consider black holes as celestial bodies (stars, planets). They seem to be quantum objects despite their apparent size.**
- The size of a new black hole resulting from the merging of 2 black holes can be interpreted as a mass loss. However, since a black hole occupies no space, the energy density (≠ quantity) of the new black hole thus formed should not be lower than that of the original black holes even at the meeting, there is a release of some of this energy.

The mass of the supermassive black hole that sits at the center of a galaxy seems in all cases insufficient to give it its cohesion. It is also possible that the cumulative gravitational forces of all the bodies constituting a galaxy, by combining, create an amplifying phenomenon. This additional attractiveness of all the bodies integrated into the galaxy, would be all the more remarkable as the galaxy is active. Difficult to pinpoint, this complex phenomenon would help to intensify the attractive force exerted on the remote regions of the galactic center.

Another point that could lead us to repeat some observations: the gravitational effects of a spherical body or of a spherical composite system, are not fully exercised with an equal intensity at any point of the surface of this body or this systemic space depending on whether one is placed at the pole or at the equator. The ballet of bodies surrounding a galaxy and which gives a relatively flattened form to it, is practically at a right angle from the rotation axis of the system taken in isolation. This way of occupying space makes that the gravitational effects of such a system are mainly developed on the plane of the equator. these features could contribute to explain partially, the leakage effect of bodies gravitating around active galaxies presenting for the most part a form of cake.

Another point to consider: the closer they are to the galactic center, the hotter and denser the gases. They show higher agitation and carry more energy than distant and colder gases. The mass determined from the radiation of these hot gases may therefore appear to be undervalued.

The more we are interested in the distant Universe, the more we look into the past. **It is therefore logical that we should note a matter deficit that is not yet observable because this matter would have been structured, densified in a more recent past.** This lag represents the time taken by the measurement made on the past of a distant event to reach us. Indeed, if the EMW are routed at light-speed, their journey, for the observer that we are, is far from linear in a congested relativistic space and unequally depressed. We can deduct from this that the light of a galaxy 1 million light-years away probably took more than a million years (time of the observer) to reach us. In addition, the shortest waves do not necessarily follow the same path as the EMW of larger wavelengths. The radiation we receive cannot therefore correspond to that emitted in the past, nor overlap very exactly with the gravitational effects observed.
For the record:

- A year of a distant past has little to do with a current year as we live it.
- The energy fields crossed by the EMW emitted several million years ago, interacted on them. The latter have not ceased to suffer besides the gravitational effects of the bodies approached, those of countless sources of radiation. The amplitudes, emission peaks, frequencies of the RFC cannot give only an inaccurate representation of our Universe as it was in its beginnings.

This means that we are recording a distorted image of a past that we relate whatever we do to a space/time that makes our proximity present. The Universe that we discover at the limits of the observable, has experienced many upheavals since this photo of a «flashed» Universe, when he was so different from our local universe.
Distant galaxies appear deformed and warmer than they should be today, with intense thermonuclear agitations. These galaxies of a past time when time was less dilated, seem to turn and move too fast. **The reason is that these speeds observed in the past, are related to a value of time slowed down since and which is this one of our present. The fixes applied to our observations are more speculative than well-established parameters. This would explain an exaggerated "exhaust" speed obtained with calculations difficult to detach whatever we do, from a local context taken inevitably as base of reference.**

In the past, space was more crowded with intense diffuse radiation. The matter was more diffuse with a smaller population of white dwarfs, neutron stars, black holes and other stellar bodies with high mass density. The relative speeds of rotation were probably faster in a younger Universe. Now it seems that the rapid rotation of a star, by further distorting space, modifies the gravitational effects of this body (case of the gyroscope). The speed of travel that we are observing, belongs to ancient history. If the image that reaches us could be updated, we would find that the dispersion and rotation speeds have since eroded.
Too many parameters that would allow us to correct the situation, miss to us. Do we have the means to consider as it should, the aging of our Universe?

If the light takes some time to arrive to us, however, the gravitation is a general phenomenon that affects overall in the same way, all the regions of our Universe. Of unlimited range, gravitation should therefore provide on a <u>large scale</u>, even if it is not in the domain of the observable where past and present mingle, a space/time medium reference. Representative of the evolution of our Universe, this smooth reference would be an indicator of its age without us being able to exploit it for determining age and life span of our Universe.
It has been proposed a parallel with EMW, imagining that gravitation by distorting space/time would be gravitational waves. Marked distortions of space-time perceived as gravitational waves vibrating the vacuum, are signaled to us when two very massive bodies meet.
This idea of gravitational waves is an appropriate response. But talking about deformation of space seems more appropriate. From the above, it is difficult to consider that these so-called gravitational waves propagate like electromagnetic waves. These latter suffer the gravitational distortions of interstellar space but they also contribute through magnetic fields generated by electric phenomena.

We could proceed by analogy with a closed body of water (our Universe) subjected to a fine and regular rain. The impact of each rain drop (any stellar mass) marks the surface of a halo that propagates (gravitational effects) in concentric circles that attenuate with distance. Seen in its entirety, from very high, the body of water shows a barely quivering relief (« empty »space in depression) having the same surface aspect everywhere at the same moment.

The necessary speed of release of an object decreases with the remoteness of the body that exerts its gravitational influence on it. However, this trend should be less marked, since it is not a only body but an uninsulated system whose mass is unequally distributed, as is the case with galaxies. The further one moves away from a galactic center, the more one notices that there is more mass between the point considered and the galactic center. However, this mass of dispersed stellar bodies and gases (which represent a not insignificant mass) is not evenly distributed. This form of concentric dispersion, typical of most galaxies, makes the gravitational force on the periphery should be felt more than if the entire mass of the galaxy were gathered in a single central point, where the SMBH resides. The speed of the stars in the great periphery would give the impression that they are about to escape their galaxy.
Nevertheless, number of stars frequenting this same perimeter, are certainly endowed with a sufficient speed to exit the galactic halo. This will not prevent them from being retrieved by a nearby galaxy.

Increasing the speed of movement of a body changes the energy it carries. But does the gravitational power of this same body subject to accelerated rotation, evolve accordingly?
Gravitational force and rotation give a quasi-spherical shape to most stellar bodies that centrifugal motion tends to flatten at the poles. The gravitational effect of any system must logically be strengthened on the equatorial plane. **This watchmaking mechanism that thus deforms the bodies, from the atom to the galactic clusters via the pulsars (fast-rotating neutron stars: more than a thousand revolutions/second for some), would therefore change the gravitational effects felt on the plane of rotation of galaxies.** These "additional" gravitational effects would be less prevalent in aging galaxies that are less active, less populated, and have fallen in temperature.

It is from the analysis of the spectrum of galaxies, deformed by the effects of gravitational magnifying glass and by the occupation of the travelled space that one would like to determine the mass of these and their clusters. This image that reaches us is the remnant of a distant local space-time. It is therefore not surprising that the masses so estimated prove incorrect to justify the speed of circumvolution of the stars present around distant galaxies. Explaining this failure of mass by the supposed presence of mysterious particles called wimps, was a suitable solution. However, these exotic particles must not emit or absorb radiation, which would betray their presence. Their only property would

therefore be to dig the space by their mass. But who says mass, says energy? Thus defined, these wimps would be then like minis black holes without accretion area, unable to interact with their environment, except by gravitational effect.
The idea of wimp too easily brought, recalls the discovery of neutrino. But as for the latter, its theoretical existence and its recognized properties have been widely validated experimentally, which is far from being the case of wimps prescribed empirically by general relativity. The discovery of the neutrino, the only lepton that has the particularity of being free of charge, may have led us to believe that a form of neutrino called sterile neutrino could intervene in gravitational effects because of its mass. This hypothesis remained in the state.

Dark matter thus appears as a default explanation for the misunderstood gravitational effects found on most galaxies. In effect, the masses identified and added together of all that seems to participate in these giant structures rotate on themselves prove insufficient. They explain only 20% of gravitational effects if we consider the estimated speed of bodies orbiting in periphery. Dark matter reflects our inability to identify everything that is representative of mass.

We do not have the means and knowledge to reconsider these figures. But we can ask ourselves what would happen if we arbitrarily increased, having regard to the foregoing, the rate of identified matter from 5% to 16%, deliberately chosen number to explain the following:
Remaining on the assumption of 68% dark energy, our need in dark matter will be then only 16%, that is to say, as much as identified matter. The idea that comes spontaneously to mind then would be that so-called dark matter would be none other than antimatter in quantity equal as it should be. This means that the latter would contribute half discretely to the gravitational effects after corrected estimate of the increase in the mass of galaxies as proposed earlier.
It shows also that the antimatter would concentrate where the matter is most present and more particularly where the galaxies and the black holes are. The antimatter in the discreet background of the interactions that make our symmetry, would give a signal to us in this way, from a certain scale of observation. Each quantum symmetry thus would feel the added-up effects of its opposite symmetry (see table in annex).
Recently, it has been suggested that a parallel universe (relativistic theory called Bimond) in interaction with the one we perceive, would hide behind a dark matter imagined by default. This would restore its place to the antimatter

representative of an “anti-universe” doomed to remain hermetic to our observations.
Excluding antimatter, not recognizing its gravitational power, lead us to fabricate about a hypothetical and elusive dark matter?
When we talk about dark matter, we are talking about something that we cannot represent and that we are in no way sure exists. Talking about something you have no idea about, does not really matter. While to evoke antimatter, is to speak of something that we can perfectly represent ourselves and that we know that it is present in our Universe, even if we only discern it punctually during particle collisions in particular. The analysis of the undulations of the space that the collected matter is not enough to explain, should logically make it possible to locate the origin of the responsible phenomenon or phenomena. However, if the very hypothetical dark matter is none other than antimatter in another dimension of space/ time, localizing would not mean to make accessible to the observation this chiral antimatter.

- **The Dark Energy,** which is sometimes associated with the energy of the «void» and whose reality is no more established than for dark matter, is supposed to explain the accelerated dispersal of galaxies in an expanding represented Universe.

As such, dark energy is assumed to represent other 2/3 of the energetic content of our Universe. It induces, mathematically, the necessity of a so-called cosmological constant. The latter is at the origin a logical data **(Λ)** without a physical equivalent. This constant, imagined in order to consider a supposed expansion of the Universe, support the existence of an unknown energy that would act in the opposite direction of gravitation. This so-called dark energy is neither more nor less than an assumption which satisfies to that we interpret as an inflation of space. This constant denounced by Friedmann among others, was originally imagined by Albert Einstein to balance his equations by remaining within the framework of a static Universe. Thus, any risk of gravitational collapse remained ruled out. It is not certain that A. Einstein who doubted the need for **Λ,** was intimately convinced by Friedmann when he developed the idea of an expanding Universe.

Einstein, in later denial of the authorship of this constant, was, no doubt, conscious that this one was only an artifice covering our inability to explain what will later be interpreted as a flight effect of galaxies. At the idea of

expansion, could we not substitute that of variance to the lower of the energy density in the «empty» space as developed in these lines?
To speak of density means to be interested in the «baryonisation» of the primordial kinetic energy at the end of a period of radiative entanglement and the capture without return of all the forms of energy by the black holes. We come to think that the evolution of our Universe makes of it a system far from being static but in which the effect of expansion is only an observational illusion. This lighting leads to favour an energy dynamic with concentrationary tendency (more gathered matter with more density for this one) called here retrograde dispersion.

Understood as the energy of emptiness, the cosmological constant could at most refer to the evolution of a "vacuum" that has nothing empty and would in reality be the framework of discrete interactions involving 2 chiral dimensions of space, revealing a quantum symmetry? We then understand the imperative necessity of this constant for those who reject the idea of quantum symmetry. This constant, considered as representative of an unobservable state of energy in opposite symmetry, becomes in this case a variable data brought to adjust to the concentration rate evolution of our Universe.

Galaxies that continue to "empty" themselves of their gas, stars that collapse, stars that merge and join stellar or galactic black holes, a space called empty that is increasingly stripped of its energy fields, with a growing population of black holes: this could describe the future of our Universe. **Such an evolution gives us a glimpse of an increasingly smoother space/time, called to no longer be multi-referential in a Universe where space and time will eventually lose their raison d'être.**
Black energy is a default response that we give to what we perceive as an accelerated expansion of the Universe and which is essentially based on the analysis of distant supernova radiation with a redshift.

In this idea of expansion of the Universe, we take arbitrarily but necessarily as repository, an observable environment which can only be of proximity. In these conditions, even if corrected, can we really draw exploitable measurements from the analysis of a distorted image of a distant past so different from our present proximity? In the perspective of a retrograde dispersion that does not imply real inflation of the Universe, black energy is no longer imposed and the cosmological constant of Einstein can be discarded.

If we consider that the Universe does not expand in reality, dark matter and dark energy have no more reason to be sought.

The amount of baryonic matter in our Universe symmetry is determined from the observed gravitational interactions, which are supposed to be corrected of the gravitational lens effects and other incidents of trip. But is this in our means?
The observed gravitational effects would be very possibly, to attribute half to each quantum symmetry. That changes the game!
We forget the expansion, the dark matter, the dark energy and abandon the cosmological constant in a context of symmetry. Who could complain about it?
In the end, the Universe would consist of 50% matter and 50% antimatter with discrete interactions in a shared field of EMW.

XV Inflation or retrograde dispersion?

(A simple question of point of view but which remains decisive)

If it makes it possible to justify the interpretation that we give to certain phenomena, the thesis of expansion questions us nevertheless, on its sound foundation.

- How to explain that a Universe imagined expanding and which is revealed to us mainly through events of a distant past, shows almost the same temperature everywhere? By playing the advocate of the expansion, we could however, reply that if the observable part of our Universe represents only a tiny part of it, it becomes plausible that the differences in temperature within this accessible perimeter are not really perceptible.

- Expansion presupposes a zero-dimensional starting singularity in a still non-existent space. It therefore seems sensible in view of the present state of our Universe and phenomena observed at different scales, to try to determine its rate of expansion and by the same age. But then nothing is right!
  The assumed expansion was expected to be considerable at first to gradually decrease in parallel with the fall in medium temperature of the Universe. It was even suggested that this initial expansion would have been faster than the speed of light. It is to bypass the relativity which combines time and space with the first radiative entanglements and which makes that the speed of the photons is determined by the degree of energetic occupation of space.
  The speed of light becomes then an indicator of the deconstruction state of our Universe, in other words of its age. This is also what makes it an acceptable constant for events close in time.
  At its beginning, once the radiative entanglement phase has passed, the Universe was cluttered with free particles in the diffuse state. In this kind of homogeneous cloud, the scattered primordial particles begin to gather. This is how this opaque medium of uniform density will give rise to the first composite particles then the first atoms and molecules. In a time «accelerated» due to the absence of significant gravitational effects, electromagnetism will lead to the formation of vast molecular «clouds». The latter by detaching themselves from each other, will find themselves separated by a falsely empty space that is depleted in particles of matter. This idea of «accelerated» time in a space that empties, is due to the fact that the Universe begins to acquire locally a curvature that it did not have and

which influences the properties of time (see below). These first gatherings of matter will realize the first galaxies "light" with particularly large dimensions and without any measure with the galaxies what we observe in our proximity present.

Space-time is the advanced representation that we make of a Universe where the gravitation of bodies by shaping interstellar space, influences the time of events. The contraction of the lengths (the empty space seems to tighten on itself) associated with a dilatation of time (time seems to flow less quickly), then induces the idea of a multi-referential Universe. Any observed event therefore has its own space-time. This is what we call general relativity, and which implies the invariance of the speed of light in all repositories (special relativity). Therefore, the speed of light as a constant, becomes unavoidable. If the idea of relativistic invariance for light speed does not seem to need to be questioned, how can we understand that it constitutes an impassable speed for all that makes the Universe? And above all, how to explain its limitation to 299,792,458 km/s, no more, no less? This is the whole problem of postulates as unproven principles (even if they support many applications in a context that makes our reality without more and cannot in absolute confer them the value of rule or universal constant) but which prove necessary for the mathematical elaboration of theories which for some seem to be common sense while others are totally counter-intuitive.

The explanation proposed here lies in the energy level of the so-called empty space. If relativity is based on a localization of the observer and the observed subject, it no longer has an equivalent if we apprehend the Universe in its potential globality. From this broad nonrelativistic point of view, the depressive evolution of everything that makes the space improperly qualified as void would then be decisive as to the speed of propagation of EMW. This means that the speed of light would vary over time depending on an interstellar space multi-referential which is supposed to be depleted of the energy called «void»; general relativity must then be indexed on the evolution of our Universe. We could draw a parallel with a runner moving against the grain on a long treadmill. If we slow down the unfolding of the mat, the speed of the runner relative to a fixed point of the mat does not change. However, reported at an external fixed point, it is the rider who seems to quicken the pace, while the energy that he deploys and which it gradually disposes, has not changed. To perfect this parallel, and consider the variations in the decreasing energy density of space, let us imagine an elastic treadmill that would continue to lengthen over time. Everything becomes optical illusion for an observer who would only see the runner and to whom we would hide the presence and therefore the slowing by lengthening of a treadmill! Would this not be the case with regard to the speed of light reported at the no longer low-pressure level of the so-called empty space?

We can consider that our younger Universe whose light we are receiving at the moment, experienced a particularly restless childhood with a higher rate of agitation (or retrograde dispersion) than today. The "low-pressure digging" of space had to be much faster than what we see in our nearby space, but the gravitational effects were locally of lesser intensity. This makes that the observation of distant space, gives the impression that our Universe expands the faster the galaxies are distant. And indeed, the more we look into outer space, the more distant objects seem to move away from us, suggesting that they could reach superluminal speeds. How to understand this knowing that the distance/time ratio that no one body can reach and that corresponds to the speed of propagation of EMW, must remain invariant in all repositories. This rendering is further in contradiction with the fact that by continuously plunging the «empty» space of any form of energy by grouping, the bodies inexorably would tend to move closer. The increased gravitational effects will cause them to merge into a space that fades by loss of energy.

In reality, it is the image of the objects of the past that seems to move away more and more quickly and not the objects themselves. And this image that reaches us, is nothing but a signal delivered by EMW and especially the visible light that the observed object returns us. That these EMW seem to exceed the light speed of 300,000 km/s, is explained by the fact that one second of this time is not representative of one second of our present time. In other words, if the time of the reference frame of the observed object were to pass twice as fast, the unit of length travelled by the light in the same reference frame would have to be doubled in value. This difference in time/space relativity does not mean that distances are lengthened when we look at a distance that is a thing of the past. But how could we do otherwise than bring everything back to our own temporality? This distorts our appreciation of travel. *We are a bit like the wayward traveler in the middle of the desert at the hottest hours and who sees the features of the landscape distorted at distances they do not have.*

- This apparent accelerated leak of the galaxies suggests that, after a short period of strong expansion, the expansion would have slowed down before going back up again. Regardless of the fact that we are mixing present and past, it remains to explain what would be the cause of this renewed expansion that mobilizes a lot of energy.
  But where to find this energy? The default answer would be the existence of an undetectable energy of unknown nature. Predicted and remained in the state of pure hypothesis, it will be called dark energy.

- In addition, this inflationary view of our Universe that may leave sceptical does not say whether the expansion will continue as it is today or if it will one day slow down. Which case, the Universe would then enter deflation to finish as it began. This upside-down Big-bang which bears the evocative name of Big-crunch, has all like the final collapse although this recessive process is different from the one proposed here.

How in these conditions not to be tempted to reconsider the expansion of our Universe, knowing that in astrophysics, too obvious does not always have truth value?

At the moment Big-bang, free photons and primitive quarks were indistinguishable and did not yet possess their own peculiarities. The first electrons will result from the state change of some primary particles, themselves supposed in here, product of the first -neutrino products that would have abounded at this stage. Only then will the first hydrogen atoms (the simplest atom consisting of 3 quarks and an electron) and helium (3 and 4 for the most stable) be able to be built. Formation of clouds of gas then more or less dense and hot stellar bodies will be the prerequisites for the formation of black holes. These singular stars that phagocyte matter, strip space and create by their considerable mass as a "call of air". Note that the expansionary hypothesis is difficult to reconcile with the idea of a Universe without a marked perimeter therefore without significant volume. We cannot refer to a larger set than our Universe and what would make context for it. What unit of measure would be likely to validate an expansion of our Universe by expansion of space?
The energy initiated by the Big Bang is not meant to remain «smooth and uniform». Each energy node representative of an elementary particle began a

micro depression of space. This low-pressure tendency, which achieves the assembly of quarks into hadrons (composite particles), becomes all the more intense as the number of elementary particles collected is important. With the concentrationary evolution of matter, the energy depression of space is increasing and may suggest the existence of a repulsive force (but repellent against what?).

To better represent the nature of these two phenomena (attraction and dispersion) in relative opposition, but which do only one, one could do to the extreme and on a single point (that of the staggering complexity of certain events), a very distant parallel with living organisms. These are only hierarchical models of molecules, differentiated cells, diversified organs with complementary functions. These components will gather, develop and structure themselves before reproducing themselves genetically on a very particular model: the DNA genome. Organic chemistry helps us understand some recurring mechanisms. Unexpected interactions, developed in the intimacy of matter, must however intervene in this complex and programmed assembly of particles, which perpetuates life by collecting, grouping, selecting and eliminating as needed, the countless components needed. Moreover, the enormous amount of energy (m=E/c2) necessary to realize and maintain in the state, a living organism evolved must satisfy to particularly restrictive conditions of temperature and environment.

This comparison is only valid because of the equal difficulty in describing the causes which are difficult to identify, almost predetermined interactions or inevitable that occur in these seemingly irreconcilable phenomena of gravitation of bodies and retrograde dispersion in a falsely expansionary rendering. Life, which is no other than a rather peculiar assembly of molecules, comes from the first radiations, and this is a sad irony: it does not escape the destructive effects of these same radiations. It can only continue by cloning from generation to generation, a model embryo, perfectible matrix of the human species, preferring reproduction to life extension.

Man succeeds to himself, returning in a certain way, each time, to the same initial point. However, each new generation cannot identify with the one that preceded it. The same is true of our Universe which succeeds itself in a continuum of binary system of universes in quantum symmetry but remains forgetful of its history. By extrapolating to the extreme, each new offspring like each «generation» of the Universe is in a way a return to the beginning.

What we see from our Universe is ancient history. The present and therefore real composition of our Universe is not observable beyond a present of immediate proximity. As a result, much of the matter, constructed and gathered together later that the time we are reduced to observe, is not considered in our attempts to estimate the global mass of a universe whose boundaries we do not know. How could we extrapolate from a sample of proximity measurements? And how the observation from EMW that come from the past, can make us believe that it would be possible to determine the mass of a universe with unknown dimensions. Moreover, it is to forget that clouds and scattered interstellar matter are not always visible and obscure or blur the observation. To this we can add the already mentioned the deformations of space/time due to the lens effects and gravitational shear. The obsolete nature of the data that reaches us from far away, explains that the deficiency of a hypothetical dark matter seems less flagrant in the vicinity of our solar system. All the more so since this distance remains despite our efforts to dissuade us from it, of a relative proximity.

Today, we are not really able to update what we observe from a distant past. To see the changes that have taken place since, in these distant spaces, would require us to project ourselves into the present of this distant space. However, it will not be possible to observe it until several billion years from now, if we are still present. But here again the problem of the lag will remain.

If we consider that the Universe has no measurable volume, no center and no defined edge and that any measurement shall be corrected for the effects of a relativity that keeps changing the situation, we understand that talking about inflation or expansion is a subject that is not about to be exhausted.

XVI To comprehend more precisely the gravitational effects

(A phenomenon that attracts, above all, curiosity)

One who would know quantum mechanics by ignoring the supra-atomic world (molecules, stellar bodies, galaxies and other groupings of matter), would have great difficulty in imagining the relativity of time and space and vice versa. It would be like by knowing solfeggio, by ignoring everything musical sounds. That what was a particle of matter can be annihilated by confronting to what was its symmetrical particle, brings quantum mechanics closer to relativistic physics. **Gravitation in gathering, will realize the conditions of this confrontation that will lead to the collapse of our Universe. It is inseparable from a quantum mechanics which, for its part, instructs this evolution on a minimalist scale.**

Einstein's relativity is deterministic and would like to predict the position of a body considering distortions of space-time caused by its presence and that of other bodies. Quantum mechanics seems probabilistic and uses mathematical interpretation of the wave function to determine the amplitude of possible positions of a particle. These two localization methods seem incompatible while they deal with the same subject: connect the forces that make the evolution of our universe.

Both are principles that appear to be on many irreconcilable points. The same is true of the concepts of unbounded Universe and of virtual multiverse Cosmos, yet inseparable here. The idea of this essay is to lift this border of a too flagrant incompatibility between what we believe we know, (our physical laws and our interpretations of mechanical phenomena resulting from related systems, and making a sort of scientific jurisprudence) and what a priori out of order logic makes us consider in the field of the possible. Reconciling electromagnetism and gravity, space and time are the prerequisites for a theory imagined unified.

Gravitation remains the stumbling block of astrophysics but does it justify the use of a new and hypothetical particle named graviton for the occasion? The gravitational force embodies the dynamic of assembly of our Universe. Its raison d'être seems to be able to be explained only by taking an interest in the deepest subatomic space; these force fields what serves as Space/Time in the quantum dimension.

To talk about the movement of a body is essentially to describe the changes in motion due to the gravitational effects it generates and to all those that are exerted on the same body, including during collisions. For the record, Galileo's experiment said that a cannonball and a feather released simultaneously of an equal height and which would only undergo the effect of gravitational force, would hit the ground at the same moment if there was no atmosphere. This is not entirely correct in that the mass of the ball, being greater than that of the pen, adds to the gravitational effects of our planet, an insignificant gravitational effect that the pen does not have. This means that the inertia of a body is constantly modified in speed and direction and that the orbitals, at any level, have nothing of perfect circles or ellipses (cf. the problem of 3 bodies and more).

How for gravitation refer to the density of matter and EMW intensity:

- The depression of space by gravitational effects, constantly modifies the movement of the bodies, justifying their variations of mass and density, their trajectories and their sequences. *Thus, on Earth, compared to the planet's center of gravity (the point where gravitational effects are compensated but the density is highest), liquids (oceans) of lower density are more distant than solid bodies (rocks) and gases (atmosphere), even less dense, are more distant than liquids.*

  Almost every stellar body is animated by a movement of rotation on itself. Internally, this movement is not uniform and it creates friction zones between the different layers. This agitation is accompanied by differences in temperature and density between layers. The surface areas are generally less hot than the internal areas (case of terrestrial planets). Thermonuclear reactions within stars such as our Sun, mean that density helping, the warmer areas can nevertheless be located in intermediate layers.

  The idea retained here, makes of gravitation, through omnipresent electromagnetic interactions at all levels, the result of «discrete» interferences between two symmetrical universes. These hidden interactions would in their own way ensure the cohesion of the components of matter. **This assembly, which produces the atom, has led to claim the presence within the atomic nucleus, of an irresistible force of short radius of action: the so-called strong nuclear force. It is hard however not make a parallel between the gravitational "force" and electromagnetic force.**

  Gravitation represents a dynamic of contraction of distances all the more marked that we place ourselves in the vicinity of a body and that the latter is massive (the earth is a repository for what concerns us). But, by changing the scale, the farther the observation goes, the longer the distances seem to be lengthening, with the impression of a distancing of the bodies. The faster they are distant from us. This optical illusion is explained by the fact that our ability to observe does not correct the effects of relativity.

When a car goes away, we notice that the audible waves emitted by the vehicle, lengthen. Now, we can also consider that it is not the car that moves but the route that has lengthened. For this, it is enough to give an ever more important curvature to the road which then becomes sinuous. When we look in the distance, so in the past, this is a little what happens but the rugged course of the image that we receive, escapes us.

It would not be a galaxy that runs away from us, but the distance that separates us which seems stretched due to a temporality that has slowed down from the moment depicted in the photo received and that represents the time to travel to us. Indeed, in a younger Universe observed and where matter was more scattered, the photons were the referents of a time which elapsed more quickly. The distances then seem to us to be lengthened by the simple fact that we remain in our present time, that of a region of the Universe that evolves in a gravitational context that makes our reality. But our space of today in advanced depression is not the distant space that we observe.

In this past, gravitational effects were manifested on a general level with less intensity. The depression of the space of the past was less dug than it is currently. If the Universe on a large scale is globally isotropic and homogeneous, it is not static, nor unchanging, nor eternal. The time of the past by giving the impression of flowing faster than today, the speed of light seems all the more accelerated as we scrutinize it in a more distant distance. Galaxies and stellar bodies give space-time its flexibility because of the gravitational effects they generate. This is why the wavelengths coming from a distant past keep getting longer. This phenomenon, which we interpret as a Doppler effect, may have suggested that we would be able by scientific calculations to go back in time and determine the age of our Universe. This fact inspired the theory of photon aging, an hypothesis that does not explain everything but that joins the idea of a non-expansionary Universe.

The RFC radiation, if it tends to corroborate the theory of a Big/bang, does not validate, however, the hypothesis of a point singularity, without remarkable initial volume and which would have started to swell like a balloon. If this diffuse radiation explains in part, the turbulent past of our Universe, it does not mean that galaxies move away from each other in an expansionist dynamic. It fails to consider the increasing depression of the called empty space. It is not considering as it should, the general relativity in our understanding of the evolution of our Universe.

Formulated differently: Radiation that conveys the image of distant events or objects are EMW of the past. To reach us, these waves travelled through regions of space that affected them all the more as they travelled for a long time, suffering the effects of the repositories they crossed. So, we understand this lengthening of the wavelengths coming from a distant past as a lengthening of the distances. It is the Doppler effect that makes that when the source of emission moves away, the wavelengths seem to stretch. It is true that it is not obvious to integrate in our observations, this double volatility of time (local and over time) and space finalized by Einstein in his theory of relativity.

- A black hole where energy is confined to the extreme, should ignore unlike any other body, the density strata. All that crosses the accretion disk is now deprived of interactions, in the likely state of a kind of plasma without mass (radiative), cold, super fluid due to a flawless homogeneity. But no doubt, it is not really liquid as we understand it, because of the extreme density it represents.

The external appearance of a black hole gives the impression that it has all the characteristics of a solid body, without noticeable activity, immutable although the destination state of the energy which it continuously absorbs remains unknown. In the absence of revealing advance observations, its intrinsic state remains inaccessible. Its status which seems to be on the fringe of space/time, may not make the difference between super solid and super fluid state and look like nothing that is in the domain of what we know. The elementary particle considered here as a packet of waves and which will eventually fall into a black hole, could it not also be in this same presumed confusion of state? But how to explain this ambiguity of properties or superposition of possible states? For both, the phenomenon of decoherence seems not to be able to manifest itself in the fact that we cannot physically represent an elementary particle or a black hole. This implies that no wave function is likely to describe what is an elementary particle as a black hole outside of any interaction. We are talking about two systems of quantum nature, intangible, closed to any introspection and prohibiting any form of physical representation. How then, in these conditions propose a predictive model of state probability. In reality, we are talking about solid, liquid, or gaseous states, plasma and other intermediate states because these are states that we can identify. But as regards the particle and the black hole, the confusion of state is only an allegory intended to illustrate our inability to imagine what these two quantum «objects» really are.

In a black hole, the atoms are deconstructed. The energy is maximum in a sort of fixed disorder. As at the moment Big-bang, the photons mediating electromagnetic interaction, are no longer distinguishable from the rest.

$E = mc^2$ no longer makes any sense, no mathematical equation can define a black hole, lack of appropriate parameters and data.

- Matter and antimatter will eventually merge into a virtual state found, where Planck sizes, like our laws of physics, become irrelevant. A state where kinetic energy, matter, space and time are no longer differentiated and which makes one sense the absence of physical reality of the multiverse Cosmos.

- This ending singularity will restore to the multiverse Cosmos the energy it bore. We can imagine that a new binary system of Universes in quantum symmetry opens up “elsewhere” even if Big-bangs and Big-crunches are not really related to each other in a continuum of without number of Space/Time.

How to explain the gravitation with reference to space and time in a context of symmetry:

The two symmetrical states share a time which is however not the one we know. *We can draw a parallel with the inverted and shifted image that returns a mirror in a gallery of mirrors oriented askew. Our reflected image is not in our field of vision and we cannot see it, this does not prevent it from reacting in the same way as the model, without any delay other than the time of light transmission.*
Every particle has its anti-particle. Both, in their own symmetry, are the product of intricate waves whose vibrations, oscillations and other fluctuations would be symptomatic of a broken cosmological balance. In a recurrent need to materialize to conceptualize, the atom is the minimalist representation most within our reach of these wave aggregates.

To illustrate this point, particles and anti-particles can be compared to parallel dotted lines, of complementary colors, closed on themselves and which would be superimposed, the dotted lines of one line alternate to the absence of stroke of the other. In the end, if it were not for a slight shift (still this chirality of symmetry), we should no longer distinguish 2 discontinuous lines, but one and the same line without hyphenation and cancelling, from afar, color perception for a neutral tone (no color displayed).

The fermions, except for the neutrinos of «too little» of mass, are endowed with electric charges that allow the relatively stable assembly of the components of the matter. **Thus, the life of the proton and its satellite particle the electron, would endure except nuclear imponderable. It is this type of "accident" that happens particularly when a supernova leaves behind a neutron star. This phenomenon by transforming the protons of the disappeared star into neutrons by "ingestion" of electron, generates anti-electrons as well as neutrinos. the latter contribute to the smooth running of these exchanges by preserving the charge balances without any significant change in the masses present.**

In an atom, we call strong force which keeps quarks on the one hand and nucleons on the other hand, linked together, thus ensuring the cohesion of the nucleus. The neutron star, like any other body of considerable mass, attracts to it the surrounding objects. (See chap. XVI and XVII correlating strong interaction and electromagnetic interaction). The absorbed matter is then, in a way, neutronized.
Nothing says a neutron star is totally homogeneous. Convection points would signal areas with unequally distributed charge intensities. It cannot be ruled out that a neutron star can house heavy quarks such as charm, top, strange, bottom quarks. By interacting with each other, these irregularities would release X-ray emissions primarily. Indeed, unlike a black hole, the gravitational power of a neutron star is not enough to hold this radiation which manifests to us in the direction of its magnetic axis, intermittently at the rate of rotation of the star. A neutron star that emits such a periodic signal is called a pulsar.

The neutron star is in a way an unfinished black hole except that it reports its presence in visible light without the presence of a remarkable accretion disc. It has shifted magnetic poles resulting from its rotation.
In a neutron star (between 1.4 and 3.2 times the mass of the sun), electrons and protons assemble into 'future-less neutrons'. But, beyond 3.2 times the mass of

the sun, the nucleons are broken, fuse and the energy finds a primitive and cold state, typical of black holes. Increased porosity of the "zone" of exchange between quantum symmetries could explain the emergence of particle-antiparticle pairs, detected during the emission of high-energy jets.

The limits to gravitation:

The experiment carried out using 2 close conductive plates, shows that these tend to get rid the space that separates them of its free particles (electrons in particular) and to capture EMW (photons). This means that by drawing energy from the so-called empty space, the matter operates, in a way that is hardly perceptible, a rapprochement with distant matter. The consequence is that the energetic density of a body increases in relation to the depression of the space within molecules, between them and between stellar bodies. On the other hand, the Coulomb repulsion force between them, of the nuclei (of the same positive charge and connected by exchanges and shares of electrons) thwarts the reconciliations, preventing them from merging and by opposing to some extent the collapse of the molecules.

Gravitation by generating more energetic density locally, causes more molecular agitation accompanied by higher temperatures. By freeing up space, a portion of the energy collected is converted to heat for a time.

The atom by the prevailing mechanism of nuclear fusion, is in a way, a maelstrom which strips the space of its energy. This low-pressure trend at the scale of the atom is over-multiplied at the molecular level. That elementary particles are not associated with an occupation of space gives the impression that they do not modify the properties of space like massive objects whose gravitational effects on the displacement of other bodies. This results in our difficulty to make the link between the gravitational effects that shape the space/time of relativity and the interactions at the scale of the infinitely small, which make quantum mechanics by appearing to hide space/time.

The gravitation will only fully intervene at the scale of the stars. But, for them, beyond a certain density, the repulsive charge of atomic nuclei becomes insufficient face of pressures. It cannot compensate for the cumulative gravitational forces resulting from electromagnetic interactions internal to the nuclei, intensified during nuclear fusion and which we could consider as representative of the so-called strong force (idea developed here). Thus, a black hole (remnant of hypernova) is formed within which atoms and molecules emptied of the space indispensable to any interaction or displacement, are no longer identifiable as such.

To break the deadlock born of the conviction of an expansion of the Universe despite an omnipresent gravitation and explain what makes the mass, it was predicted recently, the existence of a new particle: the Higgs boson. This one would give mass to bosons that would otherwise be devoid of it, to make them heavy bosons (z and w). This would allow, indirectly, to give to the fermions with a mass related to the nature of their interactions (nuclear interactions and electromagnetic). One would explain in some way, the mass of matter particles by the presence of appropriate particles intended to be force vectors. A means that could be qualified as judiciously «adapted», to explain variations of mass and density until then difficult to interpret. The Higgs particle is thus supposed to justify the synergy of movement of elementary particles.
But could we not understand it as a way of describing, without alluding to it, discrete interactions between two symmetrical states of matter? The mass of a particle become then the expression that we receive from a bundle of embedded waves in potential interaction with their symmetry. **This would imply that, without antimatter, the particle of matter could not manifest mass for the simple reason that it would not exist. The Higgs particle would be a way of interpreting the possible effects of antimatter on matter by legitimizing the resistance of bodies to any change in state of motion.**

The Higgs particle would amount to a kind of reconfigured neutrino that would have a mass equal to 130 times that of a hydrogen atom. Almost without life, it would confer mass to other particles by its mere presence. Moreover, this particle only could explain a tiny part of the mass of the particles and does not really provide any innovative light on gravity. It relates to indirect observations which are particularly delicate to implement, possibly interpreted in the direction sought.

Of zero spin, devoid of charge as well as intrinsic kinetic and magnetic movements, this boson predicts but not observable directly, would like to explain, in particular, the mass transfers during particle collisions.
But is it anything other than an elegantly elaborated hypothesis? This leads us to make here a parallel with the neutralino. This mystery particle, which is presumed to be in the form of a combination of bosons of opposite symmetry, is inspired by a theory: supersymmetry, in claim of completion. Supersymmetry

dispenses from the existence of bosons, particles of whole or zero spin considered as force vectors in interactions between fermions.

One may wonder about the nature of these bosons prescribed in an advanced framework of the standard model and which arise opportunely. Recently, there has been a predisposition to try to explain certain phenomena by the presence of new particles. It is a proven approach, but in some cases, is it not a default answer?
The Higgs field makes us think because of the properties that have been devolved to it to a kind of agglutinating ambient environment in which the particles of matter would bathe.

Higgs' theory is reminiscent of that which advocated the existence of an ether to define the space void in the beginnings of astrophysics. We can also think that mass would be only an emerging property of the radiative entanglement of the beginnings of the Universe, shared between particles and antiparticles and not an intrinsic property to the only matter. An unrecognized chirality of symmetry would perhaps help to explain not only the mass but all the distinctive properties of particles of matter that would only exist by reference to antimatter.

Obviously, our infinitely small physics is in search of new pathways.
An explanation in accord with the idea of symmetry, would be to claim that it is the nature of osmotic interactions with a Universe of quantum symmetry, which determines the properties of quanta in each symmetry.
The Higgs field when interacting with elementary particles would be supposed to impart their mass to the subatomic composite particles that are the hadrons, atomic nuclei and electron packages attached to them. In fact, the bulk of the mass of a composite particle lies in the bonding energy between them, the elementary particles that are its components. These binding forces (see chap. XVIII on the so-called fundamental interactions) participating in the mass of hadrons, nuclei, atoms, molecules and any celestial object (planet, star, galaxy, galactic cluster), the particle of Higgs cannot therefore alone, explain what makes the mass.
But understanding what the mass is central. The question is even fundamental because answering it would erase the contradictory and counterintuitive side of quantum mechanics by establishing the link with the gravitational effects that make space/time relativity. In other words, and assuming that this is in the domain of possible, how to reconcile the four fundamental forces or

interactions that govern the evolution of our Universe? This question that makes the title of this book seems clumsily formulated. Indeed, the radiative entanglement proposed here, which defines the elementary particle as a wave packet, suggests that a high intensity and short-range binding force would ensure its integrity and sustainability. That the elementary particle is not representative of occupied space, is infrangible does not mean that it is devoid of intrinsic moments even if these are not quantifiable in terms of time flow or spatial displacement.

Mass and moments of inertia would therefore only be the manifestation to the observer, of the unrecognized forces that gather and structure internally these wave packets in elementary particle. These holding forces intrinsic to the particle as to the antiparticle, have no equivalent to the gaze of the observer, insofar as everything that participates in the inherent properties of an elementary particle escapes time and space. The idea of radiative entanglement gives full meaning to the wave-corpuscle duality that so embarrasses the observer in its tangible reality. To reject this concept of radiative entanglement, can actually lead to imagine an energy field (in this case, Higgs field) filling the space and which would make resistance to the displacement of the particles. Too opportunely brought, would not the Higgs boson be dictated in reality, by the compelling need to support a standard model in sorrow?

Quantum mechanics is based partly on assumptions and conventions. This is the case with addition to the catalogue, of bosons which are not directly observable but which have become necessary for the understanding of phenomena difficult to explain differently. It became logical to endow these bosons (Z and W bosons) with a mass related to the nature of the interactions studied. Some (the W+ and W-bosons) would even reveal a charge. Would be for the needs of the cause?
The Z-boson close to the photon and whose life span is insignificant, justifies the decay of lepton/anti- lepton and quark/anti-quark pairs.
The equally ephemeral W-boson, considered inseparable from the electroweak interactions between quarks and leptons, acts as a trigger for nuclear fusion.
The presence of Z and W bosons that could never be directly observed retains a speculative aspect. Their existence responds to a mathematical logic of involving force vectors between elementary particles, themselves unobservable directly. These bosons impose themselves on us to the extent that by modeling an ephemeral link, they are supposed to explain what changes the flavor of the

quarks. This process stems from the weak interaction which can be unified to electromagnetism at a certain level of energy.

Photon and gluon are the two bosons of the table of elementary particles that have the particularity of being without mass or charge. They are associated one with electromagnetism, the other with the strong force which itself seems to be related to electromagnetic force (see below). Without effects on them, the Higgs field, which is transparent to them, could ultimately be understood as the "exchange zone", transparent to electromagnetism, between particles and antiparticles. The Higgs field would thus find its foundation in the recognition of an osmotic boundary between two quantum symmetries of the Universe. Many hidden interactions between symmetries would signal themselves to the observer that we are, through the effects of weak nuclear force in what we might then consider representing the Higgs field.

Bosons are agreed quantum entities whose la raison d'être is to allow us to represent the exchanges of energy (or information) between particles. Even if the Higgs boson may have existed, as a substantial mass particle, it is now only detectable in a fleeting, indirect way during collisions caused in giant accelerators/detectors (CERN 2012). With the latest collider accelerators, it is possible to artificially manufacture so-called exotic particles that would only exist incidentally. These particularly unstable particles are caused by point-in-time phenomena force imbalance compensators or indicators. It remains to be explained why this Higgs boson has a mass while its presence implies that the mass cannot be an acquired property of the particles, taken out of any interactive context.
Except to give this enigmatic particle, a different interpretation and not interview by which holds the pen, it is often by using such shortcuts that the limits of the abstract, things fall within the framework that we want to give them.

The cohesion of the quarks is ensured by the so-called strong force. It would be tempting to think that this short-range force, is at the source of gravitation. It has been found that the strong interactions increase in intensity if the quarks, gathered permanently in groups of 3 in general, give the impression of dissociating themselves. This irresistible force could be explained by the fact that the quarks thus united are particles out of time and that the nucleons do not occupy any space in which to distance themselves would be possible. Mass particles are considered entangled waves, confined in "closed loop" not representative of occupied space. For the photons (corpuscular representation of EMW) and given their impassable rate of propagation, time does not exist as an indicator of duration. Consequently, the mass particles that are the «crystallized» product as entangled wave packets, would themselves be at the margins of space/time. And what is out of time, becomes a spatially virtual entity which would explain the impossibility of experimentally breaking an elementary particle. This does not mean that by transposing it to the scale of the atom and more by change in scale, quantum mechanics finish to become part into the space/ time of relativity. In which case, gravity becomes a quantum phenomenon.

The atomic nucleus could mark the starting point where gravity begins to become significant by stripping space of the energy of the void.

The energy of vacuum, in reality the energy carried mainly by free EMW, represents a mass potential ($E/c^2=m$), which will end in the same way as matter, phagocytized by a growing population of black holes.

How to link electromagnetic force and gravitation of bodies:

Electromagnetism correlated with weak force (which gives the electroweak force) is considered in this reflection as depository of strong force. The energy carried by the photons, bosons without mass of the electromagnetism, can on paper, be transcribed in equivalent mass. The mass is nothing other than a relativistic measure, indicator of the degree of radiative entanglement of wave packets (massive particles) interacting with each other. This amounts to predicting that the gravitational force of bodies (complex systems of wave packets) would find its foundation in this entangled state of waves, which realizes matter. But these waves entangled in particles are originally of the same component as the EMW vectors of electromagnetism.

When the EMW are captured and transported by massive particles, including electrons, electric fields are generated.

Electric field lines reproduce energy transfers and describe the intensity of this type of interaction between charged particles. They draw open lines for particles of identical charge and looped lines for particles of opposite charges. The intensity of the electric current thus produced, results from the amount of energy expelled from atoms by the action of EMW on electrons (photoelectrons).

How can we explain that magnetic fields that do not transfer energy are associated with these electron flows, knowing that the local value of a magnetic field is given by the current intensity and the distance considered in relation to the electron flux it represents?

Magnetism is not really a source of energy but represents a local distortion of space/time resulting from the displacement and angular momentum (spin) of electrons between atoms and molecules, in the form of electric current.
The gravitational effects by distortion of space/time would only be the manifestation of this remarkable magnetism from a certain scale. Gravitation would therefore not be a fundamental force per se but the rendering through an omnipresent magnetism, quantum interactions of charges. In other words, gravitation would be an effect of electromagnetism in a context of quantum symmetry to be considered. The idea of matter/antimatter chirality involving particles and antiparticles of opposite charge underlies that the gravitational effects in each symmetry would be based on electromagnetic interactions between particles and antiparticles, generating magnetic fields modifying space-time. This may give the impression that the gravitational effects are peculiar to matter and exclusively a force in relation to the mass of the bodies considered even if those-these are generally neutral to electric charge and therefore have no reciprocal power of attraction by charge effect.
We could interpret a magnetic field as the result of a «elastic» deformation of the local space under the influence of an electric current passing through it and encountering a resistance due to insufficient conductivity of the medium. The magnetic fields modify the movement of bodies by changing the properties of space. **This amounts to saying that gravitational effects and electromagnetic fields, on different scales, join in giving our Universe its moving topology.** If we know today with general relativity, that space and time have nothing absolute, this interpretation of the electromagnetic force leads to predict that the gravitational force would ultimately arise from phenomena affecting quantum mechanics.
That antimatter can generate electrical streams with positively charged antielectrons seems quite logical. But anything to do with interactions between antiparticles, seems to remain inaccessible to any direct observation. However, these magnetic fields generated by antimatter, should contribute, as much as ordinary matter, to modify the properties of space. **We should be able to see the effects of polarization of EMW by antimatter, in the form of imperceptible disturbances of the space.** On a very large scale, the filaments

of matter that make up the backdrop of our Universe, would suffer the effects through tiny field variations giving to these filaments, imperceptible vibrations. The electrically charged particles generate magnetic fields that are for electromagnetic interaction, the equivalent of what the low mass of electrically neutral bodies is for gravitational interaction. Electromagnetic fields like the mass of bodies have in common to modify the properties of space. The intensity of the electrostatic force between two charged particles is proportional to the product of the two charges present and inversely proportional to the square of the distance between them. This formula is very similar to the mathematical expression of gravitational force. If the effects of electromagnetic fields are intended to be neutralized with distance, they remain theoretically of infinite scope as gravitational effects. The latter who decrease in the same way, proportionally to the square of the distance, end up» diluting» in a Space affected by gravitational effects without number, interfering with each other.

To summarize: the gravitational "force" would be based on electromagnetic interactions that contribute in quantum mechanics, to ensure the nucleus cohesion and the charge balance of the atom.
We know that matter is made up of particles with charge + or -, so that charge neutrality seems to be achieved on the scale of an atom, a molecule, a body. However, this does not mean that the set of charge particles + as well as the set of charge particles – of a body cannot exercise at the same time a certain overall attractiveness + or - on the particles constituting any atom, molecule or distant body. This electromagnetic interaction, of infinite scope but which quickly becomes indistinguishable on a large scale, would participate in a «diluted» way in the deformations of space/time.

A more conventional way of explaining the gravitational effects would be to agree that the matter particles that make up celestial objects, by grouping together by charge interactions (electromagnetic force and strong force when it occurs in the atomic nucleus), "alienate" in a way, a part of the space called empty. Just like the well-named black hole, the particle represents in some way a hole in space/time. This form of local depression of space is then translated into a deformation of space/ time, in relation to the mass and proximity of the object considered. The general relativity that comes from this observation, prescribes that the lengths then give the impression of decreasing while time seems to slow down in the presence of a massive object. For the ex-situ observer, this is understood as a power of attraction exerted by everything that carries a mass and is interpreted as a fundamental force of rapprochement of bodies. Similarly, for a distant observer, a body in permanent acceleration seems to acquire mass and produce the same additional gravitational effects.

The strong force could be interpreted as an intranuclear manifestation of electromagnetism. This predominant force that ensures the relative durability of the core, would produce at the macro scale, this attractiveness of the bodies that makes relativity by bending the space and deformed the time. We thus make the link between electromagnetism, strong force and gravitation.
The electromagnetism, a quantum phenomenon, could be understood as the fundamental force at the source of time and space. By realizing the constructed matter through chemical and nuclear reactions, it seems to have as first property to bring together any form of energy. In doing so, the concentration of matter induces an energetic depression of space that we assimilate, on a macro scale, to an attractive force. The gravitation and the quantum mechanics would have nothing irreconcilable. How could it be otherwise? We just have to accept that by changing the scale we have to somehow ignore general relativity for those quantum phenomena that disturb our way of thinking so much.

We perceive gravitation as a phenomenon peculiar to matter that makes space-time a flexible and dynamic framework. Lines of thought which led us to make many hypotheses about the evolution of our Universe, are not lacking. But assembling, unifying, and cohesive our most recent advances in a theory of All does not seem to have significantly progressed. Let us ask ourselves whether our analytical methods and tools likely to allow this? Although it is a priori not clearly linked, gravitation, electroweak force and strong force cannot fail to have common synergies.
The singularity that is the Big-bang, predicted without significant temperature, would have succeeded with nucleosynthesis, an excessively high temperature peak. The strong nuclear force is then distinguished from another larger force called electroweak. Without delay, an initial decrease in the initial temperature will lead the electroweak force to manifest in two notable ways. At this stage, the weak nuclear interaction and the electromagnetic interaction will be distinguished.

This explains today that, by an inverse process, under conditions of high temperature and pressure, the binding tensions between atoms change. The weak and electromagnetic forces tend to merge. This is not the case with the strong force so particular to the atomic nucleus. This force that ensures the cohesion of nucleons and their components, would not in reality reveal intrinsic and specific charge interactions to the atomic nucleus. We can consider that from a certain level of scale and energy, the 3 fundamental forces are one.

If we cannot compare an atomic nucleus to our sun and electrons to planets orbiting around, the gravitation therefore seems to be a phenomenon of quantum origin which is part of the quantum theory of fields. The difficulty is to reconcile this with the idea that particles not representative of space (and also black holes as a last destiny), would have no more phenomenological existence than these singularities called Big-bang and final collapse. On the other hand, any interaction of any kind can only be part of a temporal spatial framework. This paradox lies in the fact that our reality can only be conceived as a unit of measurement of space and time, based on observable data, feelings, and in particular by ignoring antimatter. Everything that does not find its place in our reality, for lack of reference to time (and space), remains hypothesis. To consider what exists only in power, in the purely potential state - this is the case of the elementary particle with the measurement problems raised by Schrödinger - constitutes, in a way, a heresy incompatible by nature with our way of thinking. This would explain why we cannot, at a given moment, give a particle, both a precise position (spatial coordinates in a context considered arbitrarily invariant) and a velocity of displacement (temporal data representative of a non-linear change in spatial coordinates).

XVII A gravitation that takes effect at the root of time

(Of quantum origin, it draws the topology of the Universe)

If we start from the premise that the energy revealed by the Big Bang has manifested itself from countless points of dispersion, there is no need to talk about expansion, or any speed of release. **Everything becomes interferences, exchanges and interactions in a finite Universe in an undetermined dimension and where everything is in connection with everything.**

A binary system of universes in quantum symmetry is the story of a substitution: the one that achieves the conversion of primordial kinetic energy into potential energy imbued with quantum symmetry.
The kinetic energy coming from the Big Bang and heralding the EMW, manifests itself uniformly in a space/time that it defines. It is the apparent expansion or retrograde dispersion, a scattering somehow contained.
The potential energy is of an inverse effect to that of the kinetic energy carried by the EMW. The potential energy gathers matter and captures radiation. That is how we understand gravitation.
Apparent expansion and gravitation are 2 aspects of the same phenomenon difficult to conceptualize: the energetic depression of the space "says empty".

What is true for a symmetry should be equally true for its opposite symmetry. The blended effects of dispersion and gravitation, taken under the term retrograde dispersion, can be explained by discrete interactions between the 2 inseparable and complementary symmetries (see chapter XII on dark matter and dark energy). Gravitation loses its mystery.
Particles which are supposed to be devoid of quantum symmetry (**bosons without mass and charge which are photons and gluons as transposition of the former)** or to be presumed with 2 combined symmetries (**leptons without charge and of insignificant mass which are neutrinos**), possess all vector conditions likely to be involved in osmotic exchanges between quantum symmetries. Thus, at a certain level of energy, the absorption of a **photon** by an electron can lead to the appearance of an anti-electron (positron). These two particles of opposite symmetry, placed in presence, will then annihilate without delay by giving rise to a gamma emission of equivalent energy. The **neutrinos** meanwhile, reveal their attached symmetry (antineutrino) during certain nuclear interactions (see chap. XI).

Similarly, collisions between nucleons may give rise to the furtive appearance of antiprotons and antineutrons. These confrontations lead to the annihilation of without service life mesons. Photons and neutrinos would play thus the foreground wall-passes.

In the early days of the Universe, the retrograde dispersion of particles could be represented by the more or less inflected rays of a multitude of energy fields nested in each other and without predefined dimensions. After, due to gravitational effects that add up, the displacement axes will become more and more tangential to these epicenters of energy. This amounts to seeing more and more curvilinear movements in an empty space that is impoverished more and more. This evolution allows to imagine a regression of the Universe, leading to a Big-crunch as opposed to the Big-bang. However, this final solution should not be retained, at least in its classic sense.

The apparent expansion of our Universe is in the following paradox:
We believe we see large spaces dotted with clusters of matter that are ever more distant from each other.
We do not ignore that matter gathers more and more, until it reaches unsuspected densities by changing its status. We also know that the initial dispersion rate could not be maintained with the appearance of particles with mass and that the energy intensity of EMW is becoming less and less remarkable.
What gives the impression that distances are increasing? Is this not the equivalent of the increasing mass of black holes and the rising density of stellar bodies destined to collapse on themselves? It results as a negative pressure on the interstellar space that our gaze neglects to change scale.
Formulated differently; the apparent expansion would fall under properties of the metric in space which makes that we do not control. This scenario remains consistent with general relativity when it predicts that gravitation distorts space by proscribing any displacement other than geodetic trajectories. Such a trajectory is yet not, in our view, the most appropriate to escape in a Universe that therefore presents no escape for the matter.
In space, the intrinsic properties of a body, and especially its mass, are determined by considering among others, the remoteness of this object. To calculate its distance with respect to our planet, the best method found is the one of the parallaxes from the position of the Earth over an interval of six

months, that is to say a half orbit around the Sun. The rest is a matter of trigonometry. However, as the angle becomes more and more closed with the distance and the vertices of the angles varying because of the displacement of the retained stars, this process inevitably lacks precision for the farthest objects. Moreover, the line of sight is not a straight line. When we study the light prism of a distant body, we analyze radiation that has been continuously deflected by the curved topology of space and interferes with other emissions either constructively or destructively. That our Universe presents a relative homogeneity on a very large scale, can make believe that the image that reaches us, belongs to our current reality and could travel in a straight line to us without encountering obstacles.

The light spectrum of a star comes mainly from the waves it reflects and come from the most external part. From the analysis of this spectrum, we believe we can precisely identify the elements that occupy its central part and reconstruct its history. But do the outer layers of a star are they likely to let pass enough information to reveal the nature of the phenomena it conceals in its deepest layers?

Spectrometry is often used to measure the displacement of an object and its distance by correcting the measurements with distance indicators used as benchmarks and called standard candles.

The absolute magnitude compared to the corrected apparent magnitude, would theoretically allow to determine the distances of super giant stars with luminosity regular cycles (cepheids or standard candles). However, it is not certain that the theoretical magnitude calculated on the basis of today's data corresponds to the absolute magnitude that a distant star could have had as it appears to us in a period of its past. On the other hand, the magnitude observed remains an apparent magnitude, polluted by the fields crossed and number of phenomena encountered. Are we able, for the most distant objects, to correct the effects? Moreover, how can we interpret the peaks of light observed if we are in the ignorance of the duration and the particular conditions specific to each supernova? Moreover, it is not proven that the method of assessing the absolute luminosity of nearby Cepheids remains valid for the most distant Cepheids. We know that gravitation distorts space and therefore distances. But do we take this into account as it should? It is to be feared that relativity is reduced to its simplest expression when this kind of evaluation is done.

Our line of sight, which benefits from the magnifying effect of gravitational magnifying glass, goes back time. It has nothing of a straight

line even if the Universe gives the impression that, on a very large scale, it is evolving extremely slowly, without any local phenomena being noticeable, in a homogeneous way, making its evolution difficult to interpret.

This is consistent with a commonly accepted logic that a Universe without a particular center or remarkable edges does not present overall, disparities. However, if we believe that our Universe, born of a singular point, is constantly expanding, we may be surprised that it is similar everywhere even corrected for local anomalies. This objection leads to consider as retained here, that the dynamics of our Universe does not necessarily have as corollary its expansion. When we talk about expansion, we think volume change of occupation. This would imply that we are able to form an idea of the Universe as a whole from the observable part. But how to envisage such a prediction, if we start from the idea that our Universe represented originally (Big-bang) only a non-locatable point. This non-referential point would have evolved since closed curvature without certain limits. This is a hypothesis in the form of a postulate because there are no scientific data and does not demonstrate anything.

How can the Universe, within the limits of the observable, give the impression of being globally homogeneous and isotropic when we know perfectly well that it continues to evolve and that what we see mixes a present of proximity with a distant past? It must necessarily be different in a past that we try to decipher by observing its confines. Before answering it, we must ask ourselves what this part of our Universe that is offered to our eyes represents, in relation to a whole of which we have no idea. The problem is that this leads us to imagine that our relativistic Universe would have dimensions giving it volume and therefore limits. But it is not possible to say whether these same properties evolve and above all to specify in relation to what. How to consider our Universe as «something» of geometric shape when it is supposed to have no defined center or traceable edge?

On relativity, is based the dynamic space/time of our Universe. When we affirm that the Universe is homogeneous, we refer to its only observable part and we associate events of a remote past with those of a nearby present. How could the spider-web image, received from the confines of a younger Universe, be identical to the vision we have of a Universe closer and therefore more recent? We mix the past with the present. It is difficult to reconstruct the unfolding of our Universe from these offset images of ancient times, which reach us altered and distorted.

The idea of homogeneity which means that at any point, the universe evolves in the same way, brings two questions:

- On the one hand, how the most distant events, vestiges of a past discernable at the ends of our Universe and even more so, those that escape our gaze, could they today be linked to a dynamic of proximity? This would require considering all the past evolution of our universe.
- On the other hand, since time is not absolute, how could events occupying remote repositories be seen as linked together and even more as simultaneous?
  This cannot call into question the causality principle which must then deal with the rules of relativity.

A peculiarity of gravitation (see chapter XXV on links/stretches) is that it can be considered to be exercised everywhere in the same way, under the same conditions (see fine chap. XVI). This is not in contradiction with the fact that it acts in inverse relation to the square of distances. From a certain scale more than macroscopic, we could consider that it animates the universe in all places with the same acuity, all effects combined.
Gravitation models the energetic relief of our Universe. *Any presence of mass in the «Space-time» topography of our Universe, creates a sort of more or less sucking whirlwind. Any form of energy presents in the vicinity (this proximity is particularly extensive) is affected by it, whether it can escape or not.* **But, all things considered, this image of gravity funnels enamelling our Universe seems reductive: it is the entire Universe that could be compared to a large funnel facing the multiverse.**

Like the harsh law of the jungle, it is the law of the strongest that dominates in the Universe. And the strongest, it is the body or system that shows the most weight (we must hear; the most energy collected in the least of occupied space). Is it matter that attracts matter, or is it growing adynamic of the «quantum vacuum» that brings it closer together, giving the impression that the interstitial space, being more and more deprived of its energy, does not stop expanding as the wavelengths that are manifested there.
This evolution marked by gravitational effects, would be nothing other than a quantum process intended to correct a chirality representative of a broken symmetry; in a way, a self-programmed «reset to time». To be convinced, we must consider:

• That fermions are wave packets which vibrations, realizing permanently, a closed system.
• That these wave packets are the product of radiative entanglements that marked the beginning of the Universe
• That the intensity of these first radiations from the primordial plasma is since no longer sufficient for radiative entanglements to continue
• That essentially kinetic residual radiation (current free EMW) continues to be captured by the built matter
• Let this be done the conversion of kinetic energy (to put it simply, the EMWs that make up empty space) into potential energy (to put it simply, the matter that makes up the stars). Thermal, mechanical, chemical, electrical and nuclear phenomena are the manifestation of this.
• That atoms are "open" microsystems that unite wave packets (elementary particles) assembled into molecules
• That these connections increase on the one hand the degree of depression (or energetic occupation) of the so-called empty space and on the other hand the density of mass of the bodies

Gravitation seems to be a fundamentally quantum phenomenon. Undoubtedly the idea of quantum gravitation with loop emitted by some physicists-theorists proceeds from the similar method of analysis. In the theory of quantum loop gravitation, space would represent a field of pseudo particles of space or quanta of space. This amounts to quantifying space by giving it a structure divisible into units of space more or less charged in energy. The loop quantum theory makes gravitation a quantum phenomenon but for this, it leads to obscure the 3 so-called fundamental forces of the standard model.
Pixelating space with «indivisible parts» of space, never detected but likely to interact with the matter, calls. This theory leads, as proposed here, to prescribe a universe that is not infinite. It does not rule out the hypothesis of space/time shares dedicated to antimatter?

The theory of loop quantum gravitation is purely mathematical logic and proceeds from statistical data. Totally counter-intuitive, would it not be more an exercise in style than a theory supported by a cosmological model? Loop quantum gravitation is derived from a certain field equation called the Wheeler-DeWitt equation, named after its designers. This formulation which combines several mathematical approaches is interesting in that it claims to harmonize

quantum mechanics and general relativity by making for this abstraction of time, while redefining space. We understand that such an equation is ultimately particularly difficult to interpret and the theory difficult to validate.
By integrating the mass, charge and other data that make the properties of the particle, those of discrete interactions controlled by a contrary symmetry, it should be possible not to resort to this type of field equation.

XVIII Unite gravitation with the 3 fundamental forces

(Bet or challenge?)

We are approaching a chapter of the book that can disturb due to a certain complexity and abstract notions.
The stable atoms, the heaviest as well as the lightest are charge neutral. The atomic nuclei, considered here as the seat of gravity, are globally of positive charge. They would move away from the nuclei of other atoms if there were no buffer presence of shared electrons in binding interactions. The electrons are of negative charge and electrically attracted by the nuclei which "demand" the energy provided by the photons to the electrons. The orbital motion of these is the representation we make of the inertia that keeps them at a distance knowing that they can, if necessary, change partner core. If these equilibrium conditions are not met, the electron has no place.
In nucleus/electron interactions, the movements of the particles (speed, rotation axis, orbit, spin) is adjustable. This permanent setting (*reminiscent of the gyroscope's torque effects*) ensures the stability of the atoms and their assembly into molecules. However, we cannot claim that matter adopts a form of thoughtful behaviour. Everything is done by game of influence; any start of imbalance being corrected in particular by the weak interaction.
The archetype of cosmology proposed today is based on 4 types of interdependencies or interactions:

The strong nuclear interaction (the most powerful of all) has the attractive characteristics of gravitation and concerns more particularly the **atomic nucleus**. Of very short range, this force which seems to be limited to the nucleus, recalls too much in its effects, electromagnetic interaction not to share some of its properties (see a few pages later). It put together the quarks, in the atomic nucleus and keeps them grouped in a stable way by 3.
It would involve an agent de liaison ***-the gluon-*** (not really a particle in the common sense, but necessary for our understanding of this phenomenon) without mass or charge and which is supposed to ensure the durability of this assembly. *The quarks gathered in baryons are somehow, like the wheels of a tricycle. Mounted on a frame, they give it its balance and become inseparable. In a moving tricycle, it becomes impossible to remove one of the wheels except to break the balance and break up the tricycle.* We may wonder if the chromodynamic (theory that describes the strong force by the presence of gluons) would not ultimately be a matter of electromagnetism in the deepest of matter. Past the Planck wall, the first phenomena that marked the evolution of

our Universe, have led us to differentiate today 4 types of interactions: the one that interferes with electrical charges, the one that ensures the relative durability of atomic nuclei, the one that causes them to divide or merge, the one that draws bodies into space. However, we cannot help but think that these interactions are not unrelated to each other, in a shared synergy. **This gluon could be considered to represent the electromagnetic force subtracted from any context or spatiotemporal repository within and between hadrons (composite particles of quarks).** Both gluon and photon have no antiparticle. It is logical in that the gluon can be understood as a representation in the atomic nucleus of the electromagnetic force which ensures the charge neutrality of the atom while being potentially vector of particle/antiparticle interactions.
Why do quarks have a lasting existence only assembled by 3 in the form of a nucleon? Any attempt to independence of a quark results in a repositioning constrained by the so-called strong force. Could the discrete presence of antiquarks not explain the strong interaction, considering a kind of osmotic permeability open to EMW, between matter and antimatter?
The 3 quarks of a nucleon are conventionally marked with additional characteristics to mark their complementarity, called colors. By assembling their charges and colors, these 3 quarks become almost inseparable. *There could be a plethora of "colors" (a term that means nothing here that is really definable), to dress our bestiary with particles. If we consider that it is the same for antiparticles equipped in this case with anti-couleurs or contrary colors, the superposition of the 2 symmetries would give an absence of color, to remain on this image «rich in colors».*

The low interaction affects **all levels** of matter by changing some properties of the quarks. These are local phenomena in repair of anomalies in the atomic balance normally ensured by electromagnetism (which here joins the strong force as electromagnetism joins the weak force at a certain energy level (they then merge and give the electroweak force). The weak force mainly transforms neutrons into protons and vice versa. Its scope and intensity depend on the nature of the atoms involved, more or less heavy. Phenomena of nuclear fusion and fission lead to the disintegration and reconstruction of atoms whose integrity is supposed to be ensured by the so-called strong force, presumed here to be the result of electromagnetic interactions giving to the nucleus, its cohesion. By deserting the atom that captured them for a time, the electrons ensure the bonds of neighbourhood between atoms. Thus, the molecules are built. But when the electrons struck by free particles (products of alpha radioactivity) break the charge neutrality of the atom (one proton for one

electron) by leaving the latter, the atom becomes unstable. This state also occurs when a proton of the nucleus changes into a neutron following the migration of an electron into the atomic nucleus (beta radioactivity). In either case, the atom is said to be ionized. This is where the weak interaction comes in, of which the main actor remains the electron, necessary to restore balance. Weak nuclear force only repairs through radioactivity, some charge instabilities not corrected directly by electromagnetism.
The cohesion between protons and neutrons can be disrupted and corrected in several ways.

By fission/splitting of the atomic nucleus:

- When a neutron leaves the nucleus, in a few minutes it becomes 1 proton + 1 electron + 1 anti-neutrino realizing the permeability of opposite symmetries. It is the beta decay. The radiation β is therefore a negative charge flux, consisting of electrons.
- When a heavy nucleus becomes unstable, it splits into several stable light nuclei such as helium consisting of 2 protons and 2 neutrons. It's the alpha decay. This α radiation is a positive charge flow, consisting of ions (helium nucleus 4 or single proton).
- The excess energy that accompanies the disintegration of a nucleus releases, in most cases, particularly powerful photons. This is incidentally gamma decay. The radiation γ is electromagnetic (without mass or charge).

By fusion/assembly of several lightweight nuclei:

Lightweight nuclei, such as hydrogen, fuse to form heavier deuterium nuclei within the stars, which themselves assemble to form helium nuclei etc.… Carrying out and controlling nuclear fusion would allow us to have a clean (apart from the capture of free neutrons by the envelope) and inexhaustible source of energy. The main difficulty is to succeed in triggering the fusion of deuterium and tritium atoms and then to maintain it in an enclosure made up of powerful magnetic fields. To achieve containment under extreme pressure and temperature conditions (more than 150 million degrees), we currently do not have any other process. The challenge is to design an envelope and cooling processes that can preserve the infrastructure of such a facility. This is the great ITER project on which depends, given our growing energy needs, in part to a large extent on the preservation of our planet and therefore our survival on Earth. Conducted to its end, it would be a decisive step in the history of humanity. The costs of installation and maintenance will have to be rationalized and the inevitable consequences of a lack of control of energy will have to be

limited, such as the release of heat into the atmosphere and the need to replace and clean up the irradiated containment chambers.
We know how to generate exploitable energy with nuclear fission and are seriously considering producing it with nuclear fusion. We can ask ourselves whether we could do the same with the coalescence/ disintegration of matter with antimatter. In theory, this would not be prohibited but the modalities of implementation seem today impossible to conceive.

The weak force liaison agents are represented ***by bosons (Z and W)***, endowed with mass in response to the nature of interactions. Their raison d'être is mainly to help in the «visualization» of these phenomena. To do this, these carrier-particles would adopt the quantum state best able to allow them to interact on any particle.
It seems that the weak force acts mainly on left particles and incidentally on right antiparticles. The parity CP (mirror effect) seems therefore not to be preserved in this type of interaction where antineutrinos intervene. This feature of the weak force which falls within the scope of a matter/antimatter asymmetry, would be none other than the consequence of a chirality of symmetry managing this type of interaction.

The electromagnetic interaction is remarkably observed, mainly at the atomic level. Electromagnetism is the sum of the interactions necessary for the charge equilibrium between particles. Its effects are rather short-lived. Polarities + or -, by neutralizing themselves, give a certain permanence to the atom and to matter in general.
Gravitation, on the other hand, would take up, without limitation of scope and in continuity, the effects of this electromagnetic force which makes the atom, the discernible starting point of gravitation. Even if EMW do not have gravitational mass, electromagnetism, by arbitrating the known charge interactions at the source of gravitation, would allow to conceive a model in which quantum physics and classical relativistic physics meet.
For electromagnetism, the bonding agent or exchange vector is the photon (or quantum of light) which has neither mass nor charge to be able to exchange with neutrality and communicate with the 2 symmetries. The particle/antiparticle symmetry would be decisive as to the origin of the electric charges of the particles of significant mass.
The photons that result from the annihilation of an electron with an anti-electron (or positron) can conversely be replaced by the same pair electron + positon. These radiations represented in the early times of our Universe, an

energy without common measure with that carried by the impoverished photons of the Universe we know.
Electromagnetic interaction is of quantum nature but its relativistic implications could lead to its association with gravitational effects. Covalent bonds resulting from electron transfers between atoms, gathers atoms into molecules which it gathers by realizing the constructed matter. This binding force of the electrons would participate thus, in the implementation of gravitational effects that by slowing the flow of time and contracting the lengths in parallel, bring distant objects closer together.

Let us now hypothesize that a potential antimatter, unobservable directly, interacts with ordinary matter. All the difficulty is to represent this chiral, discreet «symmetry», in superimposition of state to matter in a dimension of space/time at once parallel, shifted but inseparable from what makes our reality. Any interaction implies energetic exchanges and in particular charge relations between particles as between anti particles but also between quantum symmetries. By modifying the topology of the so-called empty space, these quantum interactions of charges between symmetries that escape any observation, would not be foreign to the gravitational approximation of the bodies.

The gravitational "interaction", as previously seen (cf. chap. XII) distorts space and acts without limit, giving its fluctuating topology to our Universe. The occupation of Space by matter determines depending of the mass and the distances, the intensity levels of gravitation. The gravitational effects are imperceptible at the scale of atoms and molecules. The rapprochement manifest itself in a remarkable way at the level of the stellar bodies but it is not just a macroscopic phenomenon. Gravitational effects manifest themselves in different forms at all levels of matter scale. This is how the clouds of hydrogen atoms and ions of the primordial Universe (HI and HII regions) evolved into molecules. The reason is that the electronic fields of atoms by sharing several nuclei, realize the bond between atoms and the assembly of molecules between them. This type of interaction by transfers of charges to the equilibrium, would fall under the electromagnetic force, which itself joins the weak force at very high energy. The nuclear fusion which gives «weight» to the atomic nucleus and therefore incidentally endows the atom with more electrons, participates in this phenomenon of grouping and densification of matter. Thus, we can explain the formation of increasingly massive stellar bodies (stars and planets) destined to complete their evolution in the accomplished form of black holes. Gravitation would therefore above all be a quantum mechanism resulting from the electromagnetic force.

The quantum mechanics is quite confounding:

(1) The particle before any measurement is a packet of waves.
(2) Any change in the state of a particle simultaneously affects the properties of other particles with which it would have shared a story. These particles would remain so, entangled forming a unique linked system.
(3) Two particles resulting from a quantum split, whether recent or very old, remain more or less in correlated quantum states. This, regardless of the growing distance between them.
(4) The quantum state of a particle is not definable a priori and can hide several values depending on an observation context that will ultimately define a state perceived by the observer as having a physical meaning in accordance with his expectations.

With these notions, consider 2 celestial objects far from each other. Like the atoms that build them, these bodies are of neutral charge but nevertheless made up of elementary particles of charge + and charge –, in equal proportion. Simply, their opposite charges neutralize themselves. Now, let us consider that these 2 massive bodies A and B share particles which, although far apart from each other, have remained entangled and form a unique system. It is a state that is not exceptional and participates in the quantum dynamics. This means that a particle X in A whose properties are correlated with those of a particle Y in B, could be in electromagnetic interactions with particles in B having an opposite electrical charge. The same would be true for the particle Y which would then share the properties and therefore the interactions of the particle X in A. In this case, although of limited effect, these non-local interactions by avoiding the way, on distances, could create the illusion of a rapprochement between distant celestial objects sharing entangled particles. The more massive the bodies are and therefore potentially carry entangled particles, the more these links of quantum nature will eventually form a form of quantum gravity. This form of hidden quantum electrodynamics would thus contribute to the energy depression of empty space, by distorting local space/time by a kind of extension of fields at the subatomic scale.

Gravitation is not really a force in motion even if we are tempted to imagine a propagation boson, carrier of the gravitational action. The gravitational effects of the bodies are not without impact on each other, the deformations of space, by modifying the course of the EMW, create deformation fronts perceived as ripples of space. This recurring phenomenon can make believe to the existence of gravitational waves and of a particle that would be specific to them as is the photon for electromagnetic waves.
This is how it was imagined a additional boson called graviton to remain on this logic of particle-vector attached to each type of interaction. But its existence too easily brought and far from being established, seems rather speculative.

The architecture of our Universe is essentially based on the presence of electromagnetic waves and in the fact that this purely kinetic energy supposed to be carried by particles without mass (photons), ensures by interacting with matter, an ever more concentrated evolution of our Universe. EMW manage at equilibrium, the charge interactions that ensure the relative stability of atoms, molecules and stellar bodies. But by associating interactively with the built matter, they deprive the energy of the vacuum of part of its intensity. It results locally more or less in depression zones of space/time that give the impression of bending the trajectories of waves and bodies. An optical effect that seems difficult to escape!

The strong force which seems to be similar to the electromagnetic force, could not arise from charge interactions between quarks as well as between protons and neutrons? gluons, which are supposed to ensure the cohesion of atomic nuclei, would then no longer have any raison d'être. Gravitational effects and strong force would in this case be side effects, relevant to electromagnetism as is already the case for weak nuclear force with the notion of electroweak force. The gravitational force would not really be a force in the proper sense but the result of electromagnetic interactions that alter the energy of the vacuum.
The energy density of the space wrinkles in some way. Although this is the only point of view of a distant observer. Indeed, when space contracts, time simultaneously expands (it slows down as prescribed by relativity). Also, nothing changes locally for the in-situ observer. However, can we, strictly speaking, report gravitational waves?

What we call by language shortcut, gravitational waves could be more accurately described as a dynamic deformation of space/time that we perceive as ripples of space. Thus, the gravitational effects of a massive body make distances appear to be shorter in the eyes of a distant observer. But it is forgetting that time slows down and that the distance/ duration ratio remains unchanged.

The very energetic EMW emitted during supernova and encounters of neutron stars or black holes, led to imagine the existence of gravitational waves. These are in fact "isobaric" ripples of space/time, particularly marked which accompany and modify the trajectories of the EMW.

By spreading in the Universe like a barometric tide, these turbulences of space interfere with each other and distort the EMW present in the space. This means that the gamma-ray bursts observed during cataclysmic events (supernovae, fusion of black holes, etc.) certainly inspired the idea of gravitational force emitted in the form of specific radiation. The gravitational distortions of space/time that make relativity, are not reflected or absorbed by matter in the same way as the EMW. They would therefore have no reason to be assimilated to waves as are the EMW characterized by their frequency or wavelength.

A constant (symbol G) is proposed to calculate the intensity of the gravitational “force” in proportion to the product of the masses and the inverse square of the distances. It should be corrected of the innumerable incidental gravitational effects due to the presence of other bodies more or less distant. Those who play jointly and concurrently, cannot be taken totally into account in the equation. Also, the result although significant necessarily lacks precision especially for the furthest bodies.
In the end, from the atoms of hydrogen (the simplest, produced mainly during the primordial nucleosynthesis) and helium (more stable), thermonuclear reactions by creating heavier elements (lithium...etc.) realize the conditions of a dynamic of our Universe, embodied on a large scale by gravitation.

If we drop an object from a certain height, it falls. It is as if the space between this object and the ground collapsed more and more rapidly during its fall. This one would not be slowed down if it was not for the atmosphere. Because we rest on the loose surface of this floor, we do not fall but instead feel an irresistible *push of our body down and that can also be interpreted as a rise from the ground upwards. It is like we are in a constant-acceleration rocket. We could say that the ground propels us up with it, just as it does in relation to the object we have let go and which it tends to approach. This effect, valid for any point of the surface of our planet, could be understood as resulting from a dynamic of gathering or densification of the matter. A way for our planet to always take «more bodies.*

Our standard model is based on 4 types of interactions. Can this rational classification, however, be suspected of arbitrariness?
The major problem is that the gravitation seems to have no clearly established link with the 3 other fundamental forces. But it is quite different if we consider that quantum symmetry justifies reclassification of the gravitation and that the strong force considered here as emanating of electromagnetic force, initiates the first gravitational effects of bodies.
We would like to make of gravitation a 4th force in the perspective of a global theory correlating among themselves all the laws of physics, without distinction of scale. This is to forget that gravitation is not a force as it is often written, but represents the dynamic of Space/time. From this point of view, Einstein's world is very similar to Planck's.

It is a broken symmetry because of chirality that would make these so-called fundamental forces stand out in our eyes. It is at the origin of such a disparity (mass, colour, spin, charge, motion, etc.), of such a complexity in the nature of the interactions and of such a diversity of energy entities (more than 60 listed particles). The final collapse will remove these disparities.
Electromagnetism and gravitation have in common that they generate effects whose intensity decreases contrary to the square of distances. What differentiates them is the level of scale and the fact that gravitational attractiveness which models space/time, must be considered in the evaluation of distances and time flow, by change of coordinates.

The distinction between electromagnetic field and gravitational field is formal. **The electromagnetic field** predicts a space where kinetic energy is likely to exchange with matter. This EMW field reveals an isobaric complex structure in dispersion mode.

The gravitational field represents an extended “absorption” space of any form of energy by matter. The gravitational field describes a Universe with rugged topography, modeling the fields of energy that make up the empty space.

At temperatures above 10^{31} degrees, like those that marked our Universe at its beginnings, strong and weak electromagnetic forces are not significant and should not be distinguished from each other. The nuclear forces and gravitational effects would have manifested with the emergence of the first packages of waves realizing the particles of matter and would be the result of charge interactions between particles. Nuclear forces would have appeared during the primordial nucleosynthesis phase. The gravitational effects would have become observable on the scale of the built matter with the assembly of the first molecules.

Gravitational force is an incident phenomenon. It appears with the first localized collapse movements of hydrogen in the state of ions (free proton), isotope 1H (nucleus with a proton), deuterium 2H (nucleus with a proton, a neutron). tritium 3H (nucleus with one proton, two neutrons) and free electrons. This slow and incessant process ordered by electromagnetic force is at the origin of the constructed material. Thus, were constituted molecules, stellar objects of all kinds, planets and stars. The latter will generate heavy atoms that will lead to diversify and densify the matter until producing these singularities on the margins of the space/ time that are the black holes. Clearly perceived at the macro scale, the gravitational force would be the transcended manifestation of quantum interactions of charges, without showed link with them.

A gravitational field can be compared to certain atmospheric phenomena (cyclone, storm spout, tornado, etc.) which, by creating and reinforcing areas of high pressure, generate by reacting, lesser pression areas. Matter, attracting to it additional matter, adds depression to depression which characterizes what we improperly call the void.
This dynamic makes that all the energy that represents our Universe does not cease to amalgamate, to «densify» to finally exclude themselves from a space in permanent depression. The same would be true of antimatter, which is reported to us, in the form of additional gravitational effects difficult to explain otherwise (see: the black matter).

The gravitation can make believe in the presence of a mysterious attractive force justifying by default, the existence of specific particles called gravitons.

This convenient device, which does not rest on any proven basis, tends to reach the idea developed differently here that gravitation is a phenomenon of quantum nature.

Another explanation used here, is to rely on the antimatter. Its predicted presence «in the shadow» of matter leads to differentiate between gravitational effects and mass inertia. At a certain level of density of the matter, the gravitational mass calculated from measured gravitational effects may not grow in the same way as the inert mass (resistance to acceleration). This would contribute in part, to explain that the curves of revolution of the bodies around a rotating system (mainly galaxies and galactic clusters), seem excessively fast. The Milgrom theory, named after its designer, also offers an alternative to dark matter. It takes up the idea developed here without however making reference to antimatter. But without antimatter how can we claim to modify the fundamental laws of dynamics (taken up in Newton's second law) relating the mass of an object to the acceleration it undergoes)?

3 forces and bosons that characterize them:

Photons confer visibility to electromagnetic interactions.

Gluons considered here as the electromagnetic force « applied » to the atomic nucleus, give visibility to the strong interactions.

The W and Z bosons would frame the weak interactions, their consequent mass representing the inertia needed to manage the nuclear accidents.

All these bosons (also called force vectors) are supposed to be emitted or absorbed by fermions (also called matter particles). The bosons as exchange particles, are not observable as such but they allow to describe otherwise than by a direct action difficult to explain, the interactions between fermions. Even the latter are detectable only through the effects that give them including, the mass state. By giving the impression of expelling or integrating bosons, the fermions acquire by reaction the movements and mutations that we are given to observe or prescribe.

Bosons are therefore supposed to trace exchanges between matter particles, classified in quarks and leptons. But is it the bosons that suggest these quarks and leptons in motion or is it the interactions between these fermions that bring the idea of bosons? On this scale, our analysis stops at these fermions (presumed bundles of entangled waves) which nothing allows us to say that they are potentially severable. It has been suggested that quarks and leptons may be unknown and undetectable subparticles. But this hypothesis, far from

any possibility of observation, brings nothing more and above all says nothing about the nature of this hypothetical particle named preon.
Our reality is made up of particles whose existence we have appropriated. They allow us to visualize phenomena revealing interactions that are too discreet to be perceived otherwise than under this trim of forces involving mass-carrying particle-fermions and particle-bosons acting as vectors exchange of information.

But also, three forces in one:
The electromagnetic forces and weak nuclear forces can be correlated with each other, even if the vectors involved, photons and Z, W bosons, have properties that distinguish them. The distinction between electromagnetic force and low interaction disappears when the energy intensity reaches a level higher than 100 giga volts. In these conditions, the Z and W bosons seem to give up their mass converted into kinetic energy. They behave like EMW. We are then talking about electroweak force.
One might think that the same is true for gravitation and strong force. Gluon and graviton would dress the same unifying phenomenon that would result, as described above, from discreet exchanges between the two quantum symmetries of our Universe in search of reunification. We could call this rapprochement: gravitational-strong action. But if we consider that what we call the strong force is, like gravity, only the result of electromagnetic interactions, then everything becomes a matter of scale.
That electromagnetism, present in the atomic nucleus, is at the root of gravitation, erases many of the discrepancies that divide our standard model.

Matter persists and can only be assembled in a context of equilibrium of charges. It is the EMW that contribute to ensuring this balance at all levels by managing and neutralizing preventively the « conflict » of charge.
These EMW by activating electromagnetic current and developing magnetic field lines, induce that the so-called strong force would be the result of a nuclear electrodynamic without which the atom could not be stable.
By changing the scale, gravitational effects could be understood as a form of cosmic electrodynamics.

In a context of quantum symmetry, chromodynamics would explain the confinement of quarks within nucleons and nucleons within the atomic nucleus. The strong force considered as specific to the nucleus of atoms, is no longer really distinguished from the quantum electrodynamics. This

leads to predict that electromagnetism would be at the origin of the gravitational effects remarkable on the macroscopic scale.

The relative stability of the nucleus can then be explained other than by the presumed existence of bosons/glue called gluons? Suspected of manifesting themselves in 8 different ways, however, they were never directly observed. If we develop the idea of a strong force not represented by gluons but by electromagnetic force, the cohesion of atomic nuclei would then be based solely on the interactive presence of quarks + and - but overall +charges, confined in a chamber maintained closed by an orbital belt of electrons charge -. The presence of neutrons whose number determines the isotropy of the chemical element (more or less stable) would participate internally, in this same cohesion of the atomic nucleus.

1. **On the cohesion of the quarks within the protons: One can imagine in each proton 2 quarks up charge +, rotating on themselves and orbiting around 1 quark down charge -, thus achieving a kind of baryonic spin. Somewhat like the electrons rotate around the nucleus on selected orbits, if only on this scale, time is not perceptible and nothing stands in the way of the indiscernible rotary movement of this triplet of quarks. This is a virtual rotation.**

2. **On the cohesion of the quarks within the neutrons: One can envisage on this same model, 2 down quarks with charge - rotating on themselves and in virtual gyration around 1 up quark with charge +.**

3. **On the cohesion of the protons between them and with the neutrons: The protons, all of positive charge, would tend to repel each other (which is not the case with the neutrons that "cement" somehow the nucleus devoid of this empty space that is so familiar to us). To explain what binds protons and neutrons nested in the nucleus of an atom despite their extreme proximity, we can present things as follows:**

Each atom has as many electrons as protons. Each electron would therefore be assigned a proton whose charge it neutralizes. To achieve the best balance, **this proton is predicted to be located opposite the center of the nucleus to the electron concerned. This would put this same proton in a position to be**

blocked by the presence of neutrons present in the nucleus and which are obstacles to the attractiveness of the paired electron. Held in the same way within the nucleus, the other protons would interact "upset" with the other electrons, each positioned in opposite of the nucleus on an orbit determined by the energy they carry (see illustration: lithium atom). In quantum physics, the wave function of the electron by meaning that it cannot be localized, simultaneously covers the virtual orbit that carries it. Due to the complexity of the interactions to be considered, there is currently no mathematical formulation that can represent the wave function of the electron in a system with more than one electron. This limits this type of application to the simplest and most stable atom: the hydrogen atom.

Our Universe should be perceived as fundamentally undulatory although our requirement of the quantum world imposes wave/corpuscle duality on us. However, the wave aspect that predominates in the case of long waves becomes, for the observer that we are, more corpuscular for high-frequency waves. Similarly, the mass particle as an inseparably entangled wave packet of high amplitude and high frequency, loses its intrinsically undulating character to the indirect observation and preferentially reveals a corpuscular aspect. **It is because it would be fundamentally a bundle of intricate waves that the particle and especially this binding agent that is the electron can diffract like the EMW, thus revealing its fundamentally undulating character. The associated wave idea formulated by De Broglie, joins in this the concept of wave function put in equation by Schrödinger.**

The particle could be likened to a black body, represented as a closed cavity, with reflective walls. This non-material quantum enclosure is representative of a certain amount of energy. The intrinsic waves carrying this energy that are contained there and do what we call the particle, are no longer differentiated in terms of frequency or amplitude. These enclosed wave packets, however, are likely to divide within the framework of the weak interaction into several particles of lower energy. In all cases, the energy is fully conserved. This quantity of quantifiable energy that is the particle, however, only reveals a given state dictated by a chosen context, involving a relationship in terms of time and space with other particles. The other possible states escape us. To give a physical meaning to a phenomenon observed or prescribed, can only be conceived in terms of space traveled and time elapsed, which is ignored by the particle which is exonerated from this fact of any introspection. This superposition of potential states that escapes the eye of the observer, has no concrete transposition in the macroscopic physical world that makes our reality (this inspired the metaphor of Schrödinger's cat, potentially dead and living at the same time). Thus, an electron reveals to us a particular state that will vary depending on the movement we recognize it and the interaction to which we think it is subjected. The particle then would be potentially likely to adopt a certain number of trajectories and speeds of movement, to change spin, to lose or acquire energy…. It is the observer who marks unconsciously the preferences. More precisely, it is the measurement process that we put in place during an observation that requires us to give a certain speed and trajectory of movement to the studied particle. By the mere fact that it intervenes and therefore interacts with the subject, the observer builds a quantum environment that belongs only to him. This vision of an invisible and disconcerting Universe nevertheless requires that everything that touches quantum mechanics be in phase in one way or another with the constructed Universe that is offered to our regard. This is where the problem lies: indeed, how can we establish a link if we must ignore time and space in our vision of quantum mechanics?

Time, space, and relativity take shape in our reality with the traceable exchanges that fall within the atomic architecture of bodies. In the absence of benchmarks or points of support, our mind is not designed to speculate on a instead counter-intuitive quantum mechanical. Our efforts to understand everything, every thought exercise, like every hypothesis is closely related to a certain metaphysical reality or vision imposes our condition on us. Our status as a living being endowed with a conscience considered advanced, cannot make us forget that we are totally conditioned, formed by limited feelings, a reduced freedom of action, a limited capacity for analysis and synthesis. Are added a sustainability that is lacking, a freedom to think far too recent, insufficient observation tools and the inevitable incidental and collateral effects of which cannot be neutralized.

The difficulty is to describe the behavior of a particle as precisely as possible. Otherwise, the wave function proposes a mathematical formulation intended to meet the definition of a wave packet. However, given the hidden variables what would be the potential quantum states, it can only be of a statistical nature.
The wave function based on the Schrödinger equation describes the evolution in terms of probability of a particle of nonrelativistic matter by attributing to it the properties of a wave packet. For convenience, a particle could be associated with a average wavelength.

There is, however, a limit to this because the greater the mass and speed of a body, (in other words the energy it carries) the shorter the wavelength associated with that body. The undulatory character of the object then becomes unobservable. In a massive body, the amount of motion is considerable and the wavelengths merge. This implies that at the macro level, the question of the superposition of states can be neglected as well as the probabilistic vision that we have of a world that is difficult to observe, two unavoidable points that make quantum mechanics so difficult to understand.

The mass effect which gives a corpuscular appearance of the material, would clothe a Universe fundamentally and exclusively made of waves in different forms: «free» EMW, intricate wave packets (particle), assembly of wave packets in a charge equilibrium (atom), molecules …. It is understandable why Einstein's formula could not fail to refer to the light velocity representing the kinetic energy of electromagnetic waves (photons) in open space.
In short, the energy of a body in motion, representative of its mass is equal to the sum:

Kinetic energy confined in bundles of intricate waves and representative of the sum of the particles constituting a body imagined at rest + Kinetic energy representative of the speed of movement of the body and its intrinsic movements) + Binding energy which contributes with the support of EMW - representative of vacuum energy - to the relative stability of the body by binding elementary particles, atoms and molecules

Multiplying by 2 the speed of a body is equivalent to multiplying by 4 its kinetic energy and therefore its total mass. On the other hand, mass and radiation are transferable to each other. Protean, fundamentally elusive but present in all things, energy remains a concept. It cannot be defined otherwise than by referring to the chosen state in which it reveals itself to us.

The elliptical shape of orbits and electron orbital jumps translate into variations in charge intensity and result from the potentially "off-centered" positioning of nucleons in the nucleus and from what we interpret as their internal motion.
The magnetic movement of the neutrons associated with a permanent dipolar electric moment, their aggregation capacity, their neutrality of charge and their

mass slightly higher than that of the protons make them united nucleons, captives of the nucleus. This ensures the cohesion of the latter (see illustration on the lithium atom). Classical physics is no longer required, if only because space and time cannot really participate in the description of what happens within a nucleon. **It should be noted that the energy measurements for these, for their elementary components (quarks) et for leptons, refer however to a unit of kinetic energy (joule, electron-volt) given for an elapsed second. This relationship to time is a mathematical necessary artifice but it confers a falsely relativistic character to quantum mechanics.**

The electron concretizes the presence of electric flows in closed circuit solidarity with the atomic nucleus. These flows generate magnetic fields that vary according to the energy carried by the nucleus and that resulting from molecular bonds. These magnetic fields contribute to the durability of the atom and the stability of the molecules.

Depending on the fragility of the charge equilibrium thus achieved, the atom will be stable such the hydrogen and the iron, or unstable such the uranium.

The electrons « activated » by the photons build the « mesh » that bring together matter at the atomic and molecular scale. The methyl chloride molecule, for example, represents the combination of 1 carbon atom with 1 chlorine atom and 2 hydrogen atoms.

This bond persists strongly in the case of a homogeneous association of molecules with compatible characteristics. For heterogeneous combinations of molecules, it is not the same. In this case, the structure of the chemical body, which is the result of expanded electron exchanges between «non-miscible» molecules, remains fragile and assumes non-covalent interactions such as some low-intensity electrical interactions, electrostatic effects, ionic bonds, hydrogens, halogens.

If we can explain the strong force by electromagnetic force and the charge interactions, it becomes possible without violating Einstein's theory of relativity to make the same kind of connection with gravity. In fact, gravitation and electromagnetism have already in common that their intensity is inversely proportional to the square of the distance to the source.

Gravitation, a remarkably perceptible phenomenon on a large scale, thus would take over from the electromagnetic force which manifests itself more particularly on the subatomic scale. From this point of view, if gravitation is billion of billions of times lower than the rapidly neutralized electromagnetic force, it would nevertheless represent in the paradigm developed here, a fallout with unlimited range of the electromagnetic force.

The EMW that make essentially the interstellar void, could therefore interact with the particles of matter in several ways:

- By realizing the strong nuclear force represented in the standard model by a boson/glue: the gluon
- By triggering the weak nuclear force represented by the Z, W bosons, intermediate vectors in nuclear decay and fusion. We know that the weak force is confused with the electromagnetic force at a certain scale of energy, realizing the electroweak force.

We can also consider that these bosons associated with nuclear interactions, have no other reality than to dress up phenomena that we are in trouble to interpret otherwise.

The EMW would work in the same way with matter and the antimatter so that without this radiant energy of the vacuum, there could not be interactions between quantum symmetries. We could say that electromagnetic radiation is in the background, since always, what makes evolve in a protean way our Universe. **Thus understood, electromagnetism would prove to be the only true fundamental force insofar as, by managing observable differences in charge, it would represent a substitute for quantum symmetry on which the observer does not have clear vision.**

<u>Another way of approaching gravitation based on the wave/corpuscle duality:</u>

The quantum physics is that any particle, any atom, any molecule, anything that gives body to matter can be defined in terms of wave functions. Within the constituted matter, the waves by interfering at all levels of scale, do it mostly constructively. The more they are able to interfere therebetween, as is the case with the most massive objects, the more associated waves are energy carriers. **However, these massive bodies, which should emit at reduced wavelengths of high-amplitude, seem not to radiate as much as they should. This suggests that they would develop internally a mosaic of depressions that**

have an impact on their spatial environment. We understand better then, the gravitational effects of the stellar bodies without the need for new particles.
Any object emits radiation of its own. Of a non-monochromatic nature, the radiation would represent the not totally smoothed addition of frequencies of multiple waves. The « average » wavelength associated with it is thus shorter when the object is more massive and closer to the observer. The closed-system embedded wave packets of matter particles, in a certain way, practice information retention. This makes the characteristic radiation of an object difficult to interpret. Thus, the fundamentally undulating nature of matter is hidden to our gaze. It would seem that any body is inclined to receive more radiation in different forms (EMW, free particles and formed matter) than it emits.

It seems that any body is inclined to receive globally more radiation in different forms (EMW, free particles and constituted matter) than it emits. What about the most densified objects that are black holes? A black hole emits no radiation, its accretion disc does it for it. Any body approaching a black hole gets hotter and hotter and luminous. But, past the accretion zone, no interaction is possible anymore. What lies hidden in the heart of a black hole, past the accretion zone, is without heat and despite an alleged potentially superconducting context, everything remains frozen. The energy that a black hole brings together no longer represents the space that is familiar to us, revealing exchanges and transmission of information. We cannot speak of frequencies or wavelengths for these singular bodies which represent the culmination in the deconstruction of our Universe.

Resulting from gravitational effects, the depression of space is a phenomenon that simultaneously, equally and at all levels of scale affects the entire Universe. It is enough to level the local particularities. Gravitational effects, which make relativity, seem to be outside the framework of this one, to the extent that gravitation draw its foundation from the electromagnetic.

The attractiveness of the bodies by contraction of space associated with a dilation of time represent the gravitation, this dynamic that makes the topology of our Universe. There is still a step to be taken which, without really questioning the essence of our achievements in astrophysics, would make it possible to reconcile what seems to be impossible. To this end, it is enough to consider that gravitation represents on the macroscopic scale

the conjugation of the effects of electromagnetic radiation that in different forms, make quantum mechanics by allowing energy transfers and groupings?

XIX Universe suspected of confusing Time and Space

(At the risk of appearing somewhat confused on this point)

The photon is no stranger to this confusion. Indeed, as we think as much in terms of the passage of time as in terms of the occupation of space, it was logical that we felt the need to model this quantum of energy purely kinetic in a form that was both undulatory (radiation) and corpuscular (particle).

The energy conveyed by the photons becomes then a dematerialized radiation, by reference mainly to the concept of field effect not circumscribed in space and evolving over time as much as a circumscribed energy packet, of a corpuscular nature that can be localized punctually. However, time and space are not really «detachable» notions, as we imagine it most often, in our equations, our speeches and our theories. Leave out of its Galilean vision, space allows the description, on a wide scale, of the observed effects of gravitation. But this induces a certain division of the observed events, necessary for their comprehension. This sequencing over an observation period, led to the invention of units of measurement considering changes in spatial coordinates, in a time that is no longer universal.

We understand space as a gravitational field with variable geometry. This fluctuating space, once corrected for local gravitational effects, would allow us to describe and understand what we are able to observe, including changes in spatial coordinates, by means of 3 planes of space at right angles and 2 arrows of time in the opposite direction. It is not certain, however, that we fully take into account the effects of space/ time relativity given the complexity of the phenomena it induces. The time is only a relativistic indicator of a dynamic that refers to the notion of space.
Can we say that space is really 3-dimensional by representing it by 3 vectors oriented perpendicularly (L x W x H)? It is to forget the gravitational deformations that make space/time relativity and the uncertainty that tarnishes all positioning and movement in quantum mechanics. A Universe without a central point or traceable edge in which parallel lines can be joined does not seem to be limited to 3 arbitrary coordinates of space. How then to define geometrically what is a part of space, while integrating:

- the notion of superposition of spaces/time between matter and antimatter
- the idea of chirality between symmetry
- the concept of space/time relativity

That space and time are not an intrinsic property to the elementary particle as to the macrocosm without physical reality named here, multiverse Cosmos, does not help to link a presumed « eruptive » singularity of beginning to a possible end date in an equally singular collapse.
Two particles which at one time or another have been united, remain potentially linked by their past. This leads to the view that state superposition and quantum entanglement seem to redefine the causality principle and the idea of linear time. The constructed matter detached from its symmetry, configures space and defines the direction of time. Some equations in quantum field theory seem to suggest that the antiparticle would travel back in time in the opposite direction of its sister particle. Our condition corresponds to a possible state of matter and therefore we can do nothing but integrate the dual concept of time and space when we think quantum symmetry. If we cannot speak of the direction of time neither for the particle, nor for the antiparticle, space and time, far from being an illusion, would only be singularized at the scale of constructed matter.

Time and space are indissociable vector quantities that make it possible to understand through logical reasoning supported by mathematical formulations, phenomena that relate to interactions between innumerable energy fields mixed in a whole, without edge or central point: the Universe.
The concept of universe binomial of quantum symmetry because of spatiotemporal chirality, allows us to go beyond. With the postulate of radiative entanglement to explain the particle of matter and considering that this one reduced to a package of entangled waves has no physical dimension, it becomes possible to connect what tends towards the infinitely small to what tends towards the infinitely large. This means setting a broader framework for phenomena framed by physical laws still too segmented and thinking of quantum mechanics in terms of probabilities and mean values.
The particle understood as a closed stationary system conceals values that cannot be separated and are not discernible because they are not representative of time and space. The apprehension can only be done through observable or prescribed interactions, by dressing it of physical quantities such as charge, mass, speed, spin,... properties related to their presumed ability to interact with other particles.

The EMW who have no mass (light simply put), seems to move instantly or, could be said, in a near-standstill time. If space were really empty of any particle of mass, the speed of light would be infinite and time as space would become meaningless.

With c potentially = ∞ and implicitly c = 0 (assumption in which space and time are not accounting), we could not state space/time and the Universe would not be. An absence of reference by lack of space/time and therefore also of possible observer, this is how we could, by extrapolation, conceptualize the multiverse Cosmos. Let us recognize that while we have a hard time imagining quantum mechanics with all its paradoxes and oddities, imagining a such multiverse cosmos becomes a real challenge to the common sense, as mathematics has no support whatsoever for describing such a concept.

If the EMW are supposed to move at constant speed in an accelerated time to the extreme, why is it not the same for the particle of matter? It should be considered as a wave packet whose internal movements are not measurable. But these intrinsic movements determine its spin in particular and give it the remarkable properties of a 3-axis gyroscope. The latter keeping its angular moments, stabilizes in space. Applied to the particle of matter, this phenomenon results in a certain inertia that represents what we define as mass.

If for each of us, time has a subjective character, it is because this psychological time finds seems to be consumed all the more quickly as the energy used in the form of a quantity of movements is important. Thus, an individual at rest (bedridden, in a passive position, handicapped motor...) does not perceive the passage of time as an individual who is engaged in intense activity (sports, hyperactive, under stress, etc.). The neural circuitry of our brain does not handle events in the same way.

If it does not seem to be able to be considered truly at the quantum scale, time begins to anticipate with the first interactions that from the atom, will lead to the construction of the constructed matter. Time is a concept of the living that allows to describe the evolution of any dynamic system. The collapse or reduction of the wave function is a mathematical concept that leads to suggest for any particle, a given state. It would in fact be a chosen state as presumed in accordance with a context that is imposed on any observer and represents its reference space/ time. The reduction of the random postulated wave function is all the more well-conceived when one considers a system with many particles. It cannot, however, be approached in a relativistic way, which leads to the idea of locality being neglected. The wave function is therefore incomplete in that it does not allow us to explain why some quantum interactions considered as non-local pose a problem when we would like to integrate them into a relativistic space/time framework. The macroscopic universe of space/time seems detached from the non-relativistic universe of quantum mechanics where the particle could not appear to us otherwise than in an implicitly chosen state. In this, all seems to reject the seductive but too convenient and possibly misleading idea of a unified model.

In our approach to quantum phenomena, this explains that the particle can only appear to us in a state explicitly chosen.

How could we see something without temporality, without dimensions and without spatial location. Yet it is this apparent incongruity that leads us to imagine phenomena as counter-intuitive as quantum superposition and non-locality. **Let us not forget that before the nucleosynthesis phase, when the dispersed matter did not yet have an atomic structure, time and space could not have the meaning we give them.**

Time is primarily; a comparator that makes it possible to relativize the interactions of built matter. In the absence of reference to the matter, the concept of time becomes difficult to grasp.
On the other hand, in relation to the idea of eternity, we could consider that a fraction of a second, like a billion years, are unrepresentative values. The same is true of any spatial measurement with regard to these two not really significant «sizes» which are the infinitely large and the infinitely small. This makes that the concept of space/ time marries with difficulty that of infinity, of eternal or timeless.

Paradox of displacement in space:
It is established that nothing is likely to move faster than the speed of light.
This does not exclude that, depending on the location and movement of the observer as of the observed subject, the time of an event may be perceived as authorizing excessive speeds. the reason is that the time cannot be calibrated in the same way here and there.
This will lead us further to return to the evolution of the Universe called to «forget», emblematic quirk of the relativity, the speed/light as constant. Is it not paradoxical, to speak of a constant in a universe where nothing is absolute, where everything is evolutionary?

The "contraction" of space in other words, its degree of occupancy would make, in a way, act as speed control. By constraining space and time, the gravitational effects of massive bodies impose a speed limit on everything that displaces energy including EMW that make light.

Paradox of space occupation:

For a hadron considered out of interaction as for a black hole passed his accretion disk, time loses all meaning and induces the absence of occupied space. If time does not prevail for the black holes and the internally elementary particles that make up the atomic nucleus, it remains an indispensable parameter of understanding for most of our observations.

For anything that fits between these two entities that mark the extremes about energy density, spatial positioning and the order of events remain imprecise given “the elasticity” of a time that is that of an observer embarrassed by levels of scale of magnitude. The present, a link between a past that no longer exists and a future that is still non-existent, remains, by definition, elusive.

Time could be interpreted as our way of apprehending an unrecognized, revealing chirality of a binary system of universes in quantum symmetry.

Our perception of time and distances is question of inertial referential. Time fades when the space considered locally seems compressed (in appearance, less space to travel). Expressed differently, space seems to disappear or withdraw on itself when time seems to slow down (case of massive objects and more particularly neutron stars and black holes) or ceases to be a significant variable (such as the speed of light considered as an impassable speed that can serve as a mathematical constant). But depending on whether you change referential (local space/time context of the observer as of the observed phenomenon), these units of standard measure that are the second and the kilometer will evolve together. We know that time expands when distances shorten under the effect of gravitational force. Time thus becomes a relativistic variable; in that it testifies to the changing topology of space. This implies that two events measured simultaneously but inevitably in separate repositories cannot be considered simultaneous. Without questioning the very principle of causality, we come up against a paradox difficult to explain, even transposed into mathematical form. This amounts to saying that there is only one present: the one who teaches our local news. That the observable universe reveals a mosaic of degraded images of more or less distant pasts, was decisive for the deciphering of the relatively recent history of it. On the other hand, and as with our weather forecasts, extrapolating the future from observations reduced to these vestiges of a past that partially escapes (unless it is for the most part) to our eyes, quickly becomes reductive.

By convenience of thought, we are reduced to neglecting the fact that the curved topology of the Universe and the absence of a unique repository -in other words relativity- do not really allow us to validate an acceptable positioning in terms of coordinates in a fluctuating space. Moreover, the default of universal time resulting, makes it illusory any measure aimed at establishing a ratio of simultaneity or duration between two distant events. Adding, as in string theory, additional spatial dimensions or locating time, are hypotheses that would logically be founded, but remain in the state of mathematical performance.

In summary, in the cosmological paradigm developed here:

- Space/time would be «derived» from a multiverse Cosmos.
- In the depths of Space/Time, this multiverse Cosmos can be expected.
- By erasing itself, a pair of universes in quantum symmetry made that the energy it represented, “joins” the multiverse Cosmos

Any binary system of universe in symmetry would therefore be a closed epiphenomenon, inherent to a multiverse Cosmos qui has no physical property or history. Who would not be tempted to draw closer to the mystical concept, old as humanity, of a divine entity without material representation and creator of all things?

In our standard cosmological model, the quantum mechanics shows no relationship with the effects of gravitation and relativity is difficult to adapt to quanta theory. It is the permanent reference to time and to space that is the problem. *Our situation is comparable to that of fish in their jars, unable to imagine what is happening outside of a restricted environment from which they cannot escape physiologically.*
In the first moments that followed the Big Bang, if we were given the opportunity to observe our Universe, this one would deny us any information revealing its future.
Similarly, «teleported» in a cooled Universe, how could we, from an empty space of everything and brought back to the presence of MMBH, imagine the genesis of our Universe? All the clues will have disappeared, no exploitable archive of the past will remain.

Our current situation has the merit of allowing some projections, if only because it meets the conditions conducive to the development of organisms capable of self-management and for the human race to become aware of both its dominant position in the world of life and its precariousness. We are able to observe the degraded vestiges of a past and project ourselves, as well as badly, into a future of proximity. But this vision remains, on the whole, disturbed or distorted, by the means of investigation limited which are not neutral to the observed subject. Access to the origin and the end of the Universe, seems before long, to have to remain an exercise of thought. The conditions favourable to life on earth, will probably end before the true answers are written and especially validated.

With a hint of cynicism, we could say that with his capacity for analysis formatted to his measure, his restricted cognitive abilities and his intuitive logic functioning by deduction, man is the abused and gullible witness of phenomena «in trompe-l'oeil».

XX Is the Time a problem for the relativity?

(Should we ignore space as we invalidated ether?)

Time does not have the distinct physical reality that we attribute to it. It is an integral part of space/time. But, if time is not a physical entity, it should be the same for space in the relativistic theory of gravity where everything becomes a question of reference. Detached from each other, time and space are artifices of thought in the sense that they facilitate the understanding of interactive discrete phenomena of quantum nature (energy in superposition of states) lending themselves above all to the observation of phenomena that fall within scales of greatness within our reach.

In our Universe where everything ends up interfering with everything, time is determined according to the mass of the bodies in close interaction. This mass represents the sum of the intrinsic and relative motions of their components. In other words, time slows down when speeds increase or add up and vice versa. That the degree of occupation of space is thus correlated to a certain elasticity of time, confers a relativistic framework on the gravitational interactions which are at the origin of the grouping of mass particles.

The measures for establishing the chronology of events and to describe the displacements in space, are not naturally perceived as relativistic. The observer we are is ontologically inclined to give them, out of convenience, a universal value. We are an integral but insignificant part of a very complex system: the Universe. But, our judgment remains conditioned by a restricted environment that does not allow us to have a broader perception of this system as a whole. Moreover, our macroscopic reality is clearly not in phase with a quantum “dimension” that seems to ignore time (past, present, future are no necessarily discernible) and seems to ignore space (non-locality, superposition of states are the manifestation of it).

Superposition of states and quantum entanglement are two disturbing quantum properties, but they lay the foundations for particle physics, which has only been around for a few decades. This disconcerting physics that we have so many difficulties to integrate into a classical physics millennia, makes that today, the study of our Universe seems on the essential, matter of scale and question of point of view. Such a logic which leads to interpretation, leads to preferences and hypotheses which remain of convenience, even if they are supported by mathematical demonstrations. What is it surprising that our cosmological model, shaken by Many shortcomings, ends up being unsatisfactory until becoming subject to caution?

Is it not time to leave the levels of quantum physics and classical relativistic physics that are already difficult to access, and take an interest in the hidden dimension of space/time: the one that tells of the discrete interactions between the 2 quantum symmetries at the border of the multiverse Cosmos?

We wonder why time and space. Although the idea seems to us a priori, devoid of common sense, we begin to realize that it is the observer thinking that we are who, ultimately, makes time and space. Time and space carry our trademark. A billion years seems to us extremely long to elapse because we cannot help but relate this period of time to a lived period that is familiar to us, such as the one that puts the earth to complete a solar orbit, or the average time of a life or the time of an earth rotation. The same is true when we talk about microseconds or Planck time. Are we really aware that in view of the past and future evolution of our Universe, these two-time measures are as derisory as each other? What seems to flow slowly or at length, can equally be understood as without significant temporality. It is an aspect of relativity that reminds us of our insignificant place in the Universe. And we would like to establish the birth certificate of our Universe and predict its end date?

Localizing, linking causes to effects and relativizing is our way of dressing in a model that we would like complete and sufficient, all the phenomena studied. Space/time of the general relativity questions insofar as it begins to take shape with the electronuclear phenomena of quantum mechanics to impose itself fully with the gravitational effects of objects that populate space.

In relativistic physics, time is a data specific to every observer. Let us recall that while the time of events seems to remain invariant for each observer, it is nevertheless relative, out of its local frame of reference. On the other hand, without our being aware of it, the local time is not absolute. How could it not evolve like the concentrationary evolution of our Universe?

Frame of events, space allows to locate what is being observed and trace the direction of movement. This definition of space is also the definition that we can give of time as speed indicator parameter and without which we could not close causes and effects. Time gives however, the impression of being free of space when we are unable to determine a position. This has the advantage of avoiding to question what the smallest measurable distance would be (Planck's

length). The time about to stop, is easier to imagine. While the idea of no space leads to think that the particle, elementary component at the base of a quantum architecture, does not really would have a phenomenological existence.
The length of Planck then becomes the mathematical artifice which, by pixelating space, makes it possible to remedy this difficulty of locating a particle as dimensionless point in space.
We shall see that the quantum entanglement by the abstraction of displacements deprives us of our most fundamental reference points, which are time and space (see chap. XXIX).

Time needs to be spatialized to be put into equations but expressed differently (something we do not know how to do) than in mathematical formulations relative to the space, it should be enough to describe events necessarily correlated to varying degrees.
If time is irreversible, then the events themselves are irreversible and a consequence is necessarily the cause of an event that succeeds it. This must be nuanced if we consider that the evolution of our Universe is programmed since the Big Bang, and that the announced final collapse then becomes inevitable. This end event without being at the origin stricto-sensus, can be somewhat arbitrarily assimilated to the primary cause of a "secondary" universe binary system in quantum symmetry. However, can we say what follows and what precedes? It is difficult to talk about chronology.

It is recognized that time would be the fourth dimension of a space perceived as three-dimensional. But we can think that the 2 fundamental dimensions are those that represent the 2 quantum symmetries. The fifth dimension of space-time advocated by T. Kaluza could be understood as a hidden dimension representative of a opposite symmetry not factual to the observer.

We can hardly imagine the interactions between particles and antiparticles that occur under the cover of a discreet «dimension», immanent to the exchanges between symmetries. Nothing is measurable for us and nothing seems to be related to our macroscopic reality. Indeed, the pragmatic observer that we are, is part of a reference of gravitational interactions of matter, defined by the Einstein's relativistic space/time and that essentially occults the interactions between symmetries.
In a thought exercise that would integrate this hidden dimension, it would be quite different. Our Universe would be in a process of deconstruction or return

to cosmological equilibrium that we could understand as a reversibility of time. In short, time could be seen as the result of an illusion of space for an observer confined to its symmetry. It must be recognized that we are naturally likely to reject this idea of a quantum symmetry, discrediting the space that is familiar to us. This concept does not correspond in any way to our reality, which leads us to interpret in a logic of feelings, phenomena that are a recognized occupation of space in which we participate as a physical entity and where antimatter seems absent.

We have seen that gravitation, by «stripping» gradually the empty space of any form of energy, changes the topology of space/time.
The distances and durations should be otherwise perceived as soon as we change the repository. And this is what happens for a clock approaching a black hole. The time of this clock would seem, in the eyes of a relocated observer, to flow more and more slowly. The deconstructed clock will stop only after passing the horizon of the black hole.

The relativistic character of time would like the low-pressure level of space to change the speed of light. The units of measure of distance and duration used to express the propagation speed of EMW, cannot be today what they were in the past. From this point of view, relativity commands us to consider everything that in the evolution of our Universe has altered the image of a past observed in the distant.

The general relativity makes that from a point on the ground, the time measured for a body located at its vertical (at the top of a mountain for example) flows less slowly than the time lived on the ground.
To say that the notions of space and time are relative means that the units of measurement are calibrated by the repository of each observer. Seen as a paradox, the order of events may even, but only in theory, be perceived differently depending on the context mass/acceleration of the observer on the one hand and the gravitational and inertial effects affecting the observed subject on the other hand.

Let us take 2 concrete examples to illustrate these remarks in contradiction with our logic of feelings at the base of Newtonian physics.

First case: that of a rocket (B) after its take-off from Earth (A) and that of the mantle (B) of a star after its explosion and which has separated from the heart (A) of it.

These events may be considered “accidents” caused or inevitable in a general process of collecting matter and converting the primary kinetic energy into potential of mass.
Initially, the two bodies A and B are one. Then B detaches itself from A by taking a part of its energy to A. This means that the mass of B, which will be partially converted into heat, becomes more important. This first case thus does not place B in symmetry of A. The acceleration of B must be greater than the gravitational effects it undergoes from A and which will be less and less felt. For both A and B, their starting time specific to a common initial repository, seems not to change. But from the point of view of A, the time experienced by B will seem slower and for B the time of A seems to flow out more quickly.

Second case: That of 2 bodies (A and B) or stellar structures (planets, star systems, galaxies and their clusters...) which are not able to resist the added gravitational effects they generate. This is the normal process which changes the inertia of a body.
A and B approach themselves and confuse some of their energies. Their masses, partially converted into heat at the time of impact, add up as the gravitational effects of these two bodies. This case, consistent with the evolution of our Universe, places B in symmetry of A and vice versa. For A as for B, their starting standard time or own time are confused. A+B’s time seems to have slowed in a space that tightens. This explains why the life span of a particle approaching our planet seems longer than the life span of that particle. This also justifies that, for us, the gravitational field of the earth shifts the light spectrum towards the red by lengthening the wavelengths that reach us.

The paradox of the twins illustrates quite well what relativity is. How could 2 twins, after travelling in different repositories, theoretically end up sharing the same repository, with different ages? If for the twin leaving the earth, the time related to that of his brother seems to shorten in the eyes of the latter, would it be the same on return? To return to the point of departure, the space traveler will have to expend as much energy as he would if he were travelling by transforming part of his inertial mass (propellant) in kinetic energy and possibly using the curvature of space resulting from the gravitational effects of approaching bodies. Curiously, the twin on earth will then appear to be accelerating and therefore its observed mass will appear to increase for the space twin, changing his perception of time on earth. This form of «semi-awake hibernation» experienced by the space traveler, seems to allow interstellar travel in a fluctuating time. But to what extent would this lead to shorter travel times and longer life for the traveler returning to his point of departure? Moreover, it remains to be seen whether these exiles will endure without damage, radiation and changes in gravity over long periods.

The notion of time being superimposed on that of space, the idea of distance must be taken in a context of curvature of space, accompanied by a lesser "compactness" of time. Thus, x times more curvature in a remote space in depression is equivalent to x times less time counted by the relocated observer than we are.
It is therefore necessary for this observer to correct the counted times and measured distances by considering the gravitational effects or accelerations experienced by the distant subject observed (case of satellite GPS).
Our Universe brings together a multitude of energy depressions more or less dug and interacting with each other. Each of these innumerable low-pressure centers has its own gravitational "engine" and its own spatiotemporal repository.
Nothing being able to be dissociated from the rest, any observed phenomenon should logically to be able to describe itself only related to a gravitational environment broader. However, too many parameters must be considered when taking measures. We can raise doubts about the appropriateness of these measures.
This is where things become particularly complicated, because two locations of space cannot share the same expanded space-time context. How could the events that characterize them then be considered simultaneous or otherwise as having pre-established links? We know that the time, thus mismatched and which does not flow in the same way, here and there, has nothing universal. It is also a way to grasp what would constitute a chirality symptomatic of quantum symmetries.

The chirality matter/antimatter puts quantum mechanics at the margin of a space/time on which our reality rests. Relativity, on the other hand, correlates the effects of constructed matter, on a macro scale, while excluding the idea of simultaneity for events that do not share a same repository. Chirality and relativity proceed from the same observation: time has nothing absolute and our time only reveals to us only what is consistent with our feelings. This would validate the idea of chosen state from between a superposition of possible states for matter observed in interactions and the absence of a recognized state for antimatter.

How describe the Universe in the immediate present? It is made up of a succession of logical events all related, incident or collateral. To speak of our Universe would require doing well, to rethink our vocabulary and to replace: object by state, matter by radiation, position by field of influence, conflict by exchange of information, structure by process, mass by energy level, etc.…

To locate something in space is to locate it in a time that is its own and different from ours. as demonstrated by A. Similarly, to circumscribe an event in time, is to locate it in a space that is exclusive to it and different from ours. Relativity is based on this rather confusing idea of repository where space and time are two variables connected in a multidimensional context.

Perhaps it is easier to represent space in relation to time by using some notions of geometry and more particularly those of planes and angle measurements. Except to resort to such mathematical artifices, let us recognize that associating time with space is at least a counterintuitive exercise.
Even if the demonstration is too simplistic and only valid to illustrate the point, let us develop this idea by considering that a mass particle is only <u>a point without dimensions in an "empty" space.</u>

- Such a point (A) taken alone, outside any context of exchange, cannot be defined by means of spatial coordinates and therefore excludes the idea of space. In the absence of any potential interaction, time has no purpose.
- Two points (A and B) taken to the exclusion of any other possible point can only refer to each other. They draw whatever their movements, a line segment what could represent the shared intersection of an infinity of planes bearing this same straight line generally perceived as curvilinear. As long as these two points do not merge in a single point, the space is summed up in this segment, a one-dimensional figure, not measurable for lack of unit of étalonnable length. Taken out of context, this right-hand segment does not reveal any significant change due to the lack of a possible referent. Time cannot relate to such a rudimentary geometric figure. We cannot talk about space/time.
- Three points (A, B and C) in a system form a triangle on a plane and create a two-dimensional space. Each of the points (A for example) can only refer to the other two (B and C) by considering the angle formed (BAC) of which it is the summit and the ratio of the distances AB/AC (that are the sides that connect A to the other two points B and C). In this flat space, any variation of one of the 3 angles formed by the triangle would translate the flow of

time. But space is not complete. It does not have the depth that we know it, so that time does not really manifest in this geometric configuration devoid of relief and which accepts no observer.

- Four points combined in an isolated system, which would satisfy the condition of forming a pyramid with a triangular base (tetrahedron), determine 4 planes, each plane cutting the other 3. 4 points, 4 planes, 4 faces for 3 dimensions of space and one time: nothing that intrigues? We could assimilate 3 faces of this pyramid sharing a common vertex, the three dimensions of space plane necessary to locate the particle appearing on that vertex. In this space where only the points of the pyramid's vertices are visible, any change affecting one of the 4 points, changes the coordinates of the other 3 points and modifies the geometry of the space they configure. Each of the points taken as a summit would therefore have its own temporality in connection with its changes of coordinates. Four particles in a system would be enough, by forming the 4 vertices of a tetrahedron, to realize the space/time with variable geometry, specific to general relativity.
- The more points are gathered in systems on several planes, the more complex the space becomes. It is the fluctuating energy density of the so-called empty space, dependent on mass effects (when several pyramids share the same summit) that determines the course of time: a more or less compressed time. This time differs from space only for the observer that we are, and because the non-flat space, delimited by more than 3 points is the condition required for an observer to be able to manifest there. The temptation would be to think that space-time and therefore the Universe exists only because it has an observer. Which goes back to the anthropogenic principle.

The phase of radiative entanglement in creating the first particles of matter was certainly not limited to 2, 3 or 4 particles. This event concomitant with the Big-bang, without significant duration, generated a phenomenal amount of first particles of matter, thus opening up the space/time in which we belong.
This is a pictorial way, rather playful, although not really in keeping with the usual scientific approach, to represent the starting point of space/time. It is also a diverted way of linking time to space.
Time seen as a succession of presents, is above all a comparison of states that refers to space in terms of distancing, occupation, positioning.

In our reality, which ignores the quantum mechanical, time begins to reveal itself on the supra-atomic scale. This means that in quantum mechanics, below what we might call Planck units, the time becomes a sort of permanent present, forgetful of a space that is no longer measurable. This would explain that the particle cannot distinguish the past from the future; the variable time is set aside. The discrete interactions between quantum symmetries thus escape our ability to understand as well as any direct observation.

By giving them a chronology, time dresses the interactions involving particles of matter that make our symmetry. This relative time is not the one of the interactions involving particles of opposite symmetry.

The thermodynamics allows to describe the physical properties of the bodies in amount of movement and heat intensity. From this point of view, the Big Bang is not an event but a "threshold" representing the opening of time. The same is true of the final collapse of a cooled Universe which translates the disappearance of the time, putting an end to a chirality symptomatic of a break in symmetry.

In short, a general process, controlled by gravity, makes that in a space in increasing depression, the relativity of time would tend to fade. Increasingly dilated, the times specific to each repository, thus evolve towards a predetermined uniformity that will lead to a common and universal «setting in time» of all repositories in a cooled Universe (see plate illustrated in appendix). Everything will end in MMBH in a predestined time to stop. At this ultimate moment characterized by the absence of repository, to say that time has disappeared, has no more meaning than to speak of infinite speed. From this point of view, quantum chirality makes also makes the space/time relativity.

By becoming partly and by radiative entanglement, particles of matter, the primordial energy has acquired a property peculiar to matter and which is at the origin of gravitational effects: the mass. These unevenly distributed effects, make time seem to flow unevenly for the delocalized observer that we are. Thus, in a space perimeter where the gravitational effects would be insignificant, time would pass so quickly that it would not be more to consider than in a black hole where time seems suspended and space emptiness appears filled. In both cases, the notion of space/time seems to be lost. It would be inappropriate to speak of illusion when we are talking about time and space, because we occupy without a doubt a part of space and live a fraction of time.

The photon, virtual particle of EMW, represents what remains of primordial energy that could not be entangled in fermion. Because it is devoid of mass, the photon would ignore time and space but contribute to give more or less mass to the matter with which it interacts. Related to a broader context that makes our reality (space/time of relativity), we have however been able to make speed light, a standard of measurement by reference to time. Time which no longer seems to be measurable on the subatomic scale, would it be a variable that exists only for the observer at his own scale and which would hold to his condition of existence? This disturbing observation leads to think that the mass would be only a mathematical artifice perfectly justified, but not an intrinsic property of the particle of matter when we bring it back to the state of wave packet (see radiative entanglement and collapse of the wave function in chap. XXIX).

For us who can only conceive of everything, every event in a spatiotemporal context and relying on the mathematical tool, the notion of Cosmos multiverse then takes over to give a name and meaning to what is reduced to the state of exercise of thought or concept. Indeed, the multiverse does not need to use these variables that are space and time and allows to broaden the debate by proposing new ways of investigation.

That space and time are not absolute, does not contradict the fact that our Universe appears globally and on a large scale, isotropic. We come to wonder if what we see and believe understand of our universe, would not be comparable to an optical illusion. It would be better to consider that what makes our reality is a realistic vision, this is entirely in line with our very special status as a conscious observer. But what we discern leads too often to interpret and formulate hypotheses. Unable to validate this by experimentation, this results too often in a lack of consensus, conflicting methodologies, and ill-founded positions. Even if the progress seems promising, we can understand our Universe only as an indivisible whole in a mathematical representation more and more advanced but that allows to glimpse limits increasingly difficult to push. Isn’t it time to reconsider a standard model that shows its weaknesses? But how to get out of this framework of observation and understanding in 4 dimensions so difficult to manipulate but which adapts so well to our reality? Are we ontologically able to represent what our Universe is in its deepest foundations, its reason for existence, its purpose?

Space (location), time (temporality), mass (gravitational effects) make our reality. On these notions, we mainly base our perception of body movement and our understanding of energy transfer. Even if our cosmological model seems to be supported, would it not be an interpretation at the height of our cognitive and intellectual capacities, without more?

The consideration of time and space would be a matter of scale and would begin with the atom to become reality with the formation of assembled matter.

Our reality is based above all on our understanding of a biotope of contact, of an environment perceived as tangible, physically palpable. In doing so, it also calls upon our imagination in the form of more or less whimsical thought exercises. Since the atom is grouped (or not) in molecules as diverse as they are varied, we attribute above all, to any object offered to our gaze, an intrinsic physical property called mass. This notion of mass allows to give a level of intensity to the resulting gravitational effects and make the topology of space/time.

But on the subatomic scale, that of quantum mechanics, we cannot really talk about objects: time as we know it, seems to lose all meaning and space seems to be forgotten. Everything then becomes interaction of fields connected to each other in wave systems and the notion of particle should no longer be associated with that of corpuscle physically taking on space. This aspect of quantum mechanics has certainly inspired the string theory where point particles are represented by one-dimensional segments in vibrations. The experiment has led, for lack of a decision, to associate the idea commonly held today, of corpuscle, with that of particle matter. But this duality wave/corpuscle has led us to prescribe the existence of additional particles/force vectors, called bosons, to explain in a macrocosm that is imposed on the observer, interactions and exchanges of information at a distance between mass particles (fermions).

- Thus, the elementary particles, virtual particles called **gauge bosons** (Z0, W and W+) have been added to the table to explain the process of nuclear decay. At high energy, these bosons make way for the carrying photons of electromagnetism in the framework of the unifying electroweak force.
- But in order to play their role as carriers of the weak nuclear interaction, these bosons (Z0, W and W+) presuppose the existence of an additional coupling boson, interacting with itself and called the **Higgs boson** (see chap. XVI). In field theory, this boson representative of a scalar field of the same name is supposed to interfere with fermions and bosons of the weak interaction, thus justifying the idea of mass perceived as an inertial

resistance.

- The **boson of the electromagnetic** (photon) essentially carrying kinetic energy, allows to highlight, the interference of charge fields between fermions on the one hand but also likely discrete interactions between particles and antiparticles. These were able to inspire the idea of an energy of point 0. The boson of electromagnetism is too involved in all kinds of clearly recognized phenomena to be able to challenge its role as a vector, The Commission has already taken a number of initiatives in this field. The photon has a major role in quantum field theory.
- As for the **boson of the strong interaction** (gluon), which could be reduced to the idea of close combination of charges in a closed system (the quarks that make up the atomic nucleus).

From this, one can ask if what we call mass, associated with the idea of corpuscle, would not be a second-best, prescribed as part of a standard model in lack of coherence. This model is based, as we have just seen, on a duality of waves/corpuscles that is imposed to the observer. The status of the latter, which is related to the biochemistry of matter, sets the framework and limits of its ability to perceive and understand what is within its reach. The problem is that it is becoming increasingly difficult to push those boundaries. And to challenge what we think is already established remains a binding exercise but one that has proven its worth.
The mass remains a significant indicator without which it would be difficult to relativize, in a cause-effect relationship and therefore temporality the energy transfers recorded between wave packets. Indeed, perceived as particles of matter, these wave packets are only kinetic energy confined in a closed system and would have to this no more mass than free EMW. Except to understand that it is precisely the bonding forces between these particle-confined waves, which generate the mass effect. And indeed, everything shows that the bonding energy becomes a mass when it comes to understanding the distortions of space/time that are gravitational effects.

The idea of collapse of the wave function that emerges from the Schrödinger equation, as that of quantum entanglement with corollary the non-quantum, should lead us to reconsider our relationship to time and space. Indeed, quantum mechanics describes particles as waves. Therefore, the matter would be made up of wave packets resulting from the period of radiative entanglement of the beginnings of our Universe and not representative of corpuscles in the sense of entities They are the result of a mysterious singularity that explains

nothing. We should consider that the duality wave/corpuscle meets the need to represent us what in a dive into the infinitely small, seems to have little relation with a macroscopic reality made mainly of recognized objects in solid, liquid, gaseous and other transition states.
To better distinguish these bundles of interwoven waves that are elementary particles, a certain corpuscular view of matter has led us to endow them with properties such as mass. Thus, quantum numbers, angular moment, charge (which would then be a transposition to the known matter of this property that singulates it from antimatter without which it would not be) and spin define the state and potentiality that they have to interact and to assemble or not with other particles and to annihilate themselves with antimatter.
Even if this judiciously adapted way of representing the matter is only a reflection at our convenience of its intrinsic content, it allows us to have a coherent approach of our Universe, at different scales and that can be validated experimentally on many points. We would have the same approach if we were operating in another space/time reference.

We give to potentially possible or prescribed quantum interactions, an extension that leads us to interpret them as related events involving effects of traceable causes. This is in total contradiction with the fact that we are now sensing that with quantum entanglement, certain exchanges would be without transfer from place to place. The problem is that few things seem within our reach, at this level of scale which is quantum mechanics. It would seem that the quantum dynamics is done outside or at the boundary of space/time. Our reality is macroscopic, imposes displacements and the light we have from it is in close relation with our condition of observer. In this evolution of a Universe that we perceive as totally factual, everything for us comes down to changes of relative positions and displacements, inducing a temporality of events. It is difficult in these conditions to make the transition by change of scale between what tends towards the infinitely small unobservable and a Universe at the far end out of reach. We cannot escape time and space and yet everything urges us to do so.

XXI About the difficulty of speak metaphysics

(Without falling into the trap of spirituality)

It is necessary to distinguish the symmetry (matter on the one hand and antimatter on the other) from the charge (positive or negative that achieves atomic equilibrium within each symmetry).

How to make an acceptable representation of an incessant «swarming» of «fields of forces» in opposite symmetries which exchange without referring to space and time that we know? To do this, we need to resort to a physics of another nature. Physics qualified here as discreet would integrate the hidden face of the Universe. It differs from the quantum mechanics resulting from technically the most advanced observations and the relativity prescribed as part of in our cosmological model.

This vision that induced the concept of multiverse Cosmos may seem speculative and negationist in many aspects. *But, to refer simply to the indispensable tool that are mathematics, is this more abstract than any square root value of a number less than 0? Although the square root of -1 for example, which can only be an imaginary number, has its raison d'être. Indeed, this number is likely to be retained in certain calculation processes. And how to interpret, without involving a time factor, inequality: A+B # B+A to remember only these two basic examples often cited?* Expressed in mathematical data, time takes liberties with ab ≠ ba. It seems that to arrive at such an inequality, we have arrived for each member of the equation, to define differently in terms of time and space, data a and b: a quirk that would be allowed by a no-relativistic symmetry.

The geometry, in its non-Euclidean forms (when 2 parallels are likely to join), would like to give space a curvature without predetermined direction. Arithmetic, on the other hand, is meant to be dematerialized and open to logics not necessarily proven. If they are susceptible of extensions that may sometimes seem disconnected from our reality, these two components of modern mathematics, do not necessarily always allow, in particle physics, to envisage the expected developments.

The use of mathematical models, such as matrices, makes it possible to formulate concepts and other abstractions in numbers and symbols more convenient to use. *For the basic « mathematician », these pages of equations resemble a labyrinth whose outcome sometimes leads back to the access portal.*

Solutions often raise more questions than answers when they do not simply leave perplexed about the interpretation to give them. It is almost as if we want to build a new kind of engine, without having fully understood its operating principle, without complete assembly instructions and without having the certainty of having all the necessary parts.

In good scientific logic, affirming something and considering it as established, supposes that what we allege:

- Corresponds to a hypothesis that is considered credible, often elaborated on the basis of axioms, assumptions or theorems but having always provided answers or solutions that meet expectations
- Be recurrent and satisfies, experimentally, all situations which may be envisaged.

When it leads to advances that meet these conditions, the mathematical treatment of these combinations or associations of data shall be validated without restrictive conditions.
But the difficulties arise when we want to consider in astrophysics:

- The idea of infinite or unbounded, when we want reason on circumscribed sets.
- Variables from space/time to more than 3 spatial dimensions that deform then quantities and relativizes the data.
- An absence of undisclosed parameters that would not be unnecessary.
- The quantum symmetry involving as a parallel dimension
- The superposition of states synonymous with uncertainty in quantum physics.
- The wave/corpuscle duality that joins the idea of decoherence and that induces all the more uncertainty in the measurement as the apparent dimension of the considered object is reduced.

To transcribe what puts in relation quantities of different nature (energy, mass, displacement), in terms of spatial representation and temporality, we needed a written language, codified and extensible. Thus, we have invented mathematics which have vocation, among others, to model complex interactions, to consider relativity and in quantum mechanics to reconcile the notion of wave with that of corpuscle. We formatted mathematical writing to our thought capacity, but did we have any other alternatives? If it allows us to approach the infinitely small as the infinitely large, it shows us their limits because of failure of data and lack of appropriate computing tools. Supported by preconstructed formulas

and standard models, mathematics guides many of our decisions. They go so far as to give meaning at random. They enlighten us on a past we have not known and project us into a possible future. This shows the importance of mathematics, which has proven its worth in all fields (chemistry, physics, medicine, computer science, climatology, etc.). This discipline is as fascinating as it is disturbing. Without the use of mathematics, how could we have developed from feelings and from essentially theoretical or empirical considerations, the practical applications we use every day?
But can we reasonably aspire to put into equation all the requisite data (many of which are missing) that deal with the state and evolution of our Universe? Such a formulation would be revealed anyway, too complex and too exhaustive for us to interpret correctly.

If we do not miss the questions, the answers generally lie in the interpretation of observed phenomena (observation) and in our capacity for analysis and synthesis (the mathematical treatments). As for the phenomena observed, we know only too much of our limits which are increasingly difficult to push back. As for mathematics, it seems that it is the same despite an increasingly sophisticated computer processing of data. We may even doubt the meaning and the solution to some particularly complex mathematical problems such as the Navier equation, the Hodge conjecture, the P versus NP problem, the Riemann hypothesis, the Birch conjecture…
In mathematics, a fundamental concept is measurement. In non-Euclidean geometry, to give a dimension, be it length, surface, volume, can be conceived only in the framework of a circumscribed space in state of being measured. In other words, a mathematical object to be accurately measured must be able to fit into a larger space or together itself measurable. But how could our Universe, presumed unbound and subject to incessant gravitational fluctuations mixed, be assimilated to a measurable space? Moreover, the idea of Cosmos multiverse instigator of universes without number and not linked, remains a concept which can hardly be assimilated to a set. It is both dimensionless and infinite; question of point of view.
Does this mean that no measure is sustainable? Space and time can hardly serve as an immutable frame of reference, in the absence of invariant and universal units of measurement actionable. To give a dimension or a position to identify and describe, implies to make abstraction of a relativity that makes the observed dynamics of our Universe. To determine a speed of movement would imply to neglect the innumerable gravitational effects which make the curvature of space. No measure can remain invariant in a Universe with a curvilinear

topology that keeps changing due to gravitational effects. Let us recall that these modify the space/time in the direction of a contraction of distances associated with what we perceive as a slowdown of the flow of time. Any measure can therefore only be based on a local unit of nonpermanent magnitude. But it remains an acceptable mathematical compromise in a context of immediate proximity or localization without temporal extension.

The mathematics have advantageously replaced the language of words, too limited and full of subjective interpretation. But their complexity due to excess of data makes that their mode of resolution can be oriented by choices or artifices of logic. With a hint of impertinence, we could then consider that their meaning is not always free of arbitrariness. Moreover, these mathematical expressions encoded in algorithms, integral calculus, differential, exponential, infinitesimal, statistical sampling … also have their limits.

Any theory is primarily an exercise in thought, usually nourished by the imagination. Any theory must therefore be corroborated by verified observations or cross-experiments. But perhaps we should accept the fact that our condition imposes to us, boundaries more and more technically and intellectually difficult to push.

These limits are given by our ability to immerse ourselves in the abstract and a certain mode of formulation that is not extensible. Any mathematical statement needs data, but are we able to do it exhaustively? An incomplete equation leads nowhere. This is the whole problem of mathematician theorists stopped in formatting and solving hypotheses, for lack of necessary ingredients.

Moreover, these tools that correct our perception of things based essentially on the feeling, do not exclude errors of interpretation. At very large and very small scales of magnitude, everything loses precision to describe itself mainly in terms of probabilities.

For example, calculating the precise evolution of a more or less elliptical orbit of a body would require in absolute to consider all the fundamental forces and gravitational effects that constantly change the topology of space/time (problem of the 3 bodies).

Every object, from the atom to the galactic cluster, undergoes the gravitational effects of the slightest object moving in a near proximity without any real limit. Objects constantly make changes in plane and trajectory, changes in their speed of movement and suffer all kinds of accidents. Any displacement is all the more difficult to determine since the close spatial context has a high energy density and the projection is for a distant future. Incorporating a considerable time

factor into the calculations, in order to project into the future, only adds more uncertainty to data of a more or less statistical nature.
Any modelling is acceptable only on limited scales of time and space. *An example of this is trying to determine the causes and predict the climatic consequences of increased greenhouse gas emissions. Too many interrelated factors add to a lack of awareness of their impact on the planet (the butterfly effect).*
But without a doubt, these complex calculations and equations sometimes inconvenient to interpret and which do not always bring the expected answers, have made it possible to progress. Without these advances, the reflection developed here would be pure fiction.

Like the first deep-sea ships which were leaving to discover the wide-open sea and unknown lands, the new technologies and computing power allowed by the development of computer software, their ability to self-program and their algorithms (what we now call artificial intelligence) augur serious progress in the knowledge of our Universe.
In all cases, these promising advances refer to physical laws that we have previously validated and which are based mainly on a spatial location and a chronology of events. However, we may wonder whether physics, chemistry, mathematics and astronomy are tools that are sufficiently inquisitive and efficient to manage one day, to decipher the origin and foundations of our Universe. For a relevant investigation in the quantum universe, the nature of the black holes and the conditions of one supposed Big-bang, many equations should disregard the relativistic space/time context.
It would also involve having hoc means of access, of an in-depth knowledge of the infinitely large and the infinitely small, supported by increasingly improbable technical experiments. Giant particle accelerators and space telescopes have a mobilizing return on investment but an increasingly dissuasive cost.
Speaking of infinitely small as well as infinitely large, does not go well with the virtual character of particles in the quantum mechanical and the idea of a Cosmos with a multi-universe vocation but without physical reality. The infinitely small as the infinitely large become, on many themes, concepts to be excluded.

To say that our Universe is 13.8 billion years old is like mixing tadpoles and frogs, the year being not a unit of duration with constant value but a variable data modelled on the evolution of the Universe. More generally, it

would seem that fundamental constants such as light speed (C), like many laws that govern the Universe, should be "indexed" to the age (or level of development) of it. Under these conditions, how can we give our Universe a credible age in a number of years or set the limits of the horizon observable in light years?
Today, we believe we know the age of our Universe, while we ignore its limits and its real content. Gravitational lenses amplify, by focusing, the intensity of radiation whatever their source of emission. As a result, the objects observed may appear oversized.
In the hypothesis of an inflationary Universe, everything that happened at the beginning of the expansion was spatially close. With inflation assumed to be exponential, the distant observable past that shows us stars that have for the most distant, ceased maybe to exist, would soon be lost sight of.

Cosmic radiation, which penetrates our atmosphere more or less deeply, consists of the one hand of electromagnetic radiation (from the longest radio waves to the shortest gamma rays) and on the other hand of free particles. These latter, composite or elemental, have, depending on their nature, particularly long lifespans (protons, electrons, neutrinos, etc.) or uncertain existence (neutrons, mesons, muons etc.). Curiously, it has been found that in this diffuse fund continues to operate the nucleosynthesis of certain elements.

The image of this diffuse fund comes to us, impaired by the stellar bodies approached and all sorts of more or less cataclysmic encountered phenomena. Also called fossil radiation, it can only give a distorted vision, not representative of what our younger Universe was. Radiation of distant origin mingling with the nearest radiation disturbs each other. We would like to extrapolate to reconstitute the conditions that marked the beginning of our Universe from insignificant evidence of anisotropy of fossil radiation. But it is forgetting that this fossil radiation that reaches us with some differences of temperature, has traveled for several billions of years and that the information it carries, has mixed up and confused with others.

Can this radiation (CMB) really be in these conditions, revealing the first conditions of the Universe?
In our presumed finite but without bounds Universe, what we observe in the diffuse state, measured at 3 Kelvins, is a radiation vestige of past events, altered by the intergalactic environment in which it bathes and interacts. This diffuse

fund, if it bears the signature of a younger Universe, does not cease to evolve. Without being able to give it a precise age, it reveals an entanglement of ancient stories affected by more recent phenomena. Once again, we are mixing present and past.

Indeed, we cannot perceive the light of the most distant stars, their light having not had time to reach us. Some stars that we see, are already extinct, others have disappeared and all the bodies shine not with as much intensity. In addition, the diffuse matter makes screen. This explains the so-called paradox of Olbers: why is the sky not fully lit at night in clear weather? We can only extrapolate by generalizing from what we see in the observable proximity. In the perspective of a non-expansionist universe, our vision of our near-universe is probably representative of its actual content.

If the path full of pitfalls (gravitational fields, magnetic fields, collisions and interactions of all kinds) had not altered the frequencies received, one can think that this diffuse background would show shorter wavelengths. It is not an expansion of the Universe that stretches the wavelengths but the increasingly marked energy depression of interstitial space. In these conditions, the radiation of fund whose emission peak is in the microwave field, can hardly help to determine the age of our Universe. In the past, space had more time (This one flow more quickly) to transfer to the present matter, the energy carried by the EMW. Several billion years later, this gives the impression that space is expanding at a faster and faster pace. Our ignorance of the phenomenon makes that in a century, we have not ceased to lengthen with equal certainty, the age of the Universe fixed initially at 1.8 billion years and then successively increased to 3.6 billion, 5.5 billion and to this day to 13.7 billion years. In these figures, we consider the year to be a unit of measurement of time that is not evolutionary and not relativistic. This is doubtful.

The advanced techniques of nucleo-chronology do not lack interest but they can hardly allow to give an age to our Universe. Too many nuclear cycles and an imperfectly understood nucleosynthesis can at most give some indication in the comparative evolution of our solar system and the galaxy it occupies.
A distant present that would be concomitant to our present, would appear to the distant traveller who would be there, rather in the form of waves staged from infrared to ultraviolet, including visible light (between 380 and 780 nanometers of wavelength) that is so familiar to us. But what does simultaneity mean in a Universe where everything is relativity?

XXII The subject is catching cold

(But is there anything to worry about!)

There is a direct relationship between the colors of the prism of light emitted by a body, the nature of the radiation received, the temperature of its outer layers and the agitation of particles on the periphery of this body. The Brownian movement describes the assumed random thermodynamic behavior of particles when it is possible to try to model it in a gaseous medium. All these indicators describe the same phenomenon: any energy in interactions observed in its different aspects. The illustration is given by a curve describing the chromatic spectrum related to temperature and which provides information on the degree of entropy characterizing any form of energy.
On such a graph, the white light clearly visible to our eyes, reflects a relatively high temperature for an agitation that is just as high. A radiation whose light prism is mainly described in the infrared means low-energy interactions, low entropy and a relatively low contact temperature. Conversely, if the dominant color of the prism flirts with the ultraviolet, highly energetic interactions will affect the environment in a consequent and more intrusive way. Below the radio waves (the lowest frequencies) as well as beyond the gamma rays (the highest frequencies), we would be tempted to imagine a transition phase in a loop and drawn a parallel with the sound waves.
Past the infrasounds would exist a non-perceptible state of reverse transition suggesting an inaudible sound without marked frequency and beyond which we would find possibly after phases of interference, the ultrasound.

If in our Universe the energy is conserved in one form or another, the EMW have never ceased to lose in amplitude and frequency. As a result, the phenomenon of radiative entanglement - at the origin of the particles of matter (fermions) - can hardly be realized, the conditions now proving difficult to satisfy. On the other hand, when the intensity of an electromagnetic field increases, the light spectrum shows a progression in the long wavelengths more marked than in the high frequencies. it reveals an emission peak shifted to red, significant of a slowed progression to shorter waves. A reverse transition phase between ultra-short Gamma waves (almost smoothed) and radio waves of excessive lengths seems therefore to be excluded. In any case, the intensity of gamma radiations is far from tending towards infinity in a Universe that has nothing infinite and where nothing can be infinite. Out of ignorance of this phenomenon, we have spoken of an ultraviolet catastrophe.

Foreshadowing the Planck Wall, the Universe was to be bathed in an indefinable state suggesting a temperature at the beginning not significant and which could be defined as the cosmic zero. The Big-bang would be, in fact, neither hot nor cold. Without delay, the first radiative entanglements by interfering between them, generated hot spots, concentrated energy in a more general phenomenon of retrograde dispersion. Visible light will only appear later before expanding its spectrum to the infrared and the radio waves.

This logic in terms of temperature, wavelength, and entropy, amounts to support the idea that Big-bang and collapse of a binary system of universe in quantum symmetry would constitute only one and the same "cold non-event", in a kind of perpetually repeatable cycle broken.

The temperature calibrated in degree centigrade, is an accounting process allowing to relativize the quantities of energy in interactions. Revealing change in some physical properties of the bodies and in particular their state (solid, liquid, gaseous, plasma), the temperature is not really a measurable magnitude. A body is hot only by reference to our touch. The particles know neither the cold nor the hot, as we feel it, but it is thus possible to evaluate the intensity of the phenomena and to try to understand the mechanics of our Universe in its ins and outs: a story that blows hot and cold.

- With the Big-bang Space-time opens. **Thermal energy gets set up and rises to its maximum** disturbing «to excess» Cosmological equilibrium in a non-localizable perimeter and without significant «volume» of space.

- Without delay, this smoothed energy, without remarkable peak, begins to reveal a disproportionate frequency, much higher than the current detectable gamma radiation. At this very moment, there could be the famous Planck wall which preludes the first radiative entanglements. The notions of displacement and dispersion space, at this first stage, begin to take on their full meaning. Very quickly, this revealed energy will begin to «focus» in each of the 2 symmetrical states, as primitive constituents of future particles and antiparticles. The opening of time notes the starting point of a retrograde dispersion that can make imagine that the Universe «explodes». The problem is that in this expansionist version, the destiny and the origin of our Universe remains without really relevant response.

  The first material formations, highly evolutive, initiate a **rapid drop in temperature which nevertheless remains excessively elevated**. In a time that «decelerates», elementary particles that have become since quarks and leptons give space its 3 D properties and timing of events. Some particles are remarkable, in particular by their adapted charge (electrons, etc.), others by their insignificant mass (neutrinos, etc.), others by their charge and their significant equivalent/mass (quarks, etc.), or by their supposed adhesive force (gluons ...). Some particles are supposed act as energy vectors (bosons of which, in the first instance, photons) and which have the particularity of being of whole spin. Some would rather have an individualistic tendency (leptons), unlike others more gregarious (quarks).

It has been inventoried a whole catalogue of elementary and composite particles, each suggesting a type of interaction and a longer or shorter lifespan. It seems that these intricate wave packets and grouped into atoms and molecules find their raison d'être essentially in their ability to integrate into predictable processes. This means that our Universe can only produce what fits within the framework of a destiny we do not know. Anything that, at any level, would not have the properties required to go in the direction dictated by the all-traced evolution of our Universe has no raison d'être in a sustainable way.

All these components whose bestiary is probably not limiting, would be likely to pass from one state to another. In the smaller disproportionately, nothing seems, at the moment, really acquired. Conventionally, charge, mass, spin, helicity, colour… have allowed, among other markers, to build a model of universe as coherent as possible. This framework presents nevertheless paradoxes and shortcomings which will undoubtedly lead to the emission or invalidation of certain hypotheses and to reconsider certain theories. Moreover, nothing says that the units of Planck (speed, energy, mass, temperature, electrical charge) and which have values of constants, are well invariable and represent the smallest values easily gauged.

- Crossed the Planck's wall, the energy released, in the form of an energy impulse that no tensor can describe, will appear in considerable frequencies which will entangle themselves into the primordial particles. **Temperatures of several billion degrees Kelvin** will lead these primitive particles to amalgamate as to confront. The first atoms, the lightest, gathered in molecules will form clouds of gas which will carry out planets and stars in all their diversity. The primordial nucleosynthesis leads to the formation of molecular gases composed of different atoms in covalent bond and stable chemical bond. **The temperature continues to drop.**

- *Simulating a follow of Big-crunch, the new particles tend to gather, similar to hailstones formed by condensation of a cooled cloud.* Gravitation is felt more. The Universe presents itself to us in the form of a conflict between a Big-bang trend and an appeal to the Big-crunch.
  The Big Bang boils down to the illusion of a generalized expansion like a «star» from an imaginary «starting point».
  The Big-crunch represents at all levels, localized movements of regrouping of matter, causing the constitution of «lumps» increasingly substantial.
  The scattered particles coming from all horizons of space-time trigger the rotation of these first gatherings of matter due to the fact that space is locally in energy depression. Gravitation, electromagnetic forces, nuclear reactions stand out. **The temperature of the Universe continues to drop, with hot spots.**

- The densification of gas clouds continues with a whole architectural variety of matter. Heavy and light particles change state and interact. Heat and visible light are the effects felt.
  At a more advanced stage, the force of attraction brings together in galaxies, most of the matter generated since the Big Bang. Gatherings are made in the form of galactic clusters. Young black holes capture dispersed matter and sit at the center of galaxies. The gravity felt around a galactic black hole becomes stronger. But the inertial effect of dispersion continuing to play, the apparent expansion does not seem to be slowed down. **The temperature drops more and more.**

- As electrons appear to rotate in general around an atomic nucleus, planets mostly revolve around a star and galaxies essentially revolve around a super-massive black hole. Galaxy clusters have a rotational motion around a central point, whether or not it is a federating galaxy. These clusters of galaxies are undoubtedly assembled into systems affected by the same rotation movement, although on a large scale, the watchmaking mechanics of the Universe seem to be crumbling. The Universe is more structured in the form of a wide-meshed net in an interstellar space that shows extensive regions, vestiges of the past, poor in galaxies.
  At this disproportionate scale, the galaxies, the clusters of galaxies and most of the matter in dispersion, follow in the Universe, *converging roads and which join, such as our rivers, with their tributaries and any adjacent watercourses.* The electromagnetic fields which intervene in all these phenomena of matter do not cease to stretch these roads of convergence

more and more congested. The large spaces that separate them are the «territory» of residual EMW and baryons scattered that will end up captured by the MMBH in a getting colder space.
On a very large scale, concentrations of galaxies draw like an immense 3 D spider web which, it must be remembered, can only be representative of a distant past and would therefore be more filiform today. If they seem stripped of matter, the large spaces left empty in this cosmic canvas, are filled with residual radiation that cannot be understood as a repulsive force but gives the impression that these empty spaces are becoming more and more extensive.

When stretched to the extreme, these connected traffic corridors, which give the impression of stretching, should eventually break into separate segments, by densifying more and more. No doubt this is already happening in our universe of proximity (and therefore also outside our field of vision, in the whole of our Universe), although we cannot make the observation for lack of hindsight. **These segments, remnants of what were the paths of gravitation, will continue internally the process of assembling matter. Each of these concentrations will eventually form a MMBH in a cooled Universe.**

At this stage, innumerable black holes of phenomenal masses seem to drift ever further apart from each other. **The temperature gradually becomes very low.** The Universe ages "more slowly" in a slowed dispersion, a consequence of a space in advanced depression.

- In the far future, within each MMBH now without an accretion disc, **the temperature is to its lowest level.** The space strips himself of any flow of energy. In an exotic plasma without significant mass, but devoid of magnetic field, superfluid but not really liquid, the black hole traps the free particles. The electrons which transfer their energy there change state definitively (see chap. VI and XII). The magnetic field that accompanied them, is fading with the declining rotation of the MMBH.

- Absolute zero (-273°) is given as the lowest possible temperature. It would correspond to that of a so-called black body without thermal energy. But how to understand this, knowing that everybody is representative of a minimum of energy likely to generate a minimum of interactions and therefore a little bit of heat. It would therefore seem that **the true absolute zero, without possible reference with our temperature scale based for**

certain measures, on the change of state of the water, can be conceived only within a MMBH in a Universe end-of-cycle. The multiverse cosmos cannot be defined in terms of temperature.

We could almost make the genesis of the Universe from its thermodynamic. In short, the primordial kinetic energy, became initial energy plasma without significant temperature then potential energy at high temperatures, will end up being converted into a dark and cold energy in the form of black holes. The loop closes. This unfolding is consistent with the hypothesis of a thermal death of a Universe where all forms of dispersion and interference have ceased.

Clearly, this idea does not align with the generally accepted idea of a Universe that would cool down due to a scatter of the energy it represents and understood as an accelerated expansion of the space. This belief of an expanding Universe, may indeed seem more in line with our regard of an observer integrated into the observed system. But this paradigm of an expanding Universe, without limits, without end, without beginning, although born of a so-called singular event, inspires more questions than it provides constructed answers. This is why our reference cosmological model remains an unfinished draft in a lack of coherence and from which we have so much difficulty to extract ourselves.

Universe and thermodynamics:

1. The energy that keeps constantly changing shape, suffers no overall loss, preserving in a way the integrity of our Universe and respecting the first principle of thermodynamics.
2. The thermal death of the Universe by collapse implies, in the absence of significant time, the cessation of any form of remarkable entropy within the MMBH. This does not contradict the second principle of thermodynamics which predicts a growing and irreversible disorder for an isolated system. Indeed, if retrograde dispersion results in decreasing entropy in our Universe, the latter, arbitrarily detached from its quantum symmetry, cannot be assimilated to an isolated system. In search of a relative balance, sometimes the disorder is “functionally arranged.” This is the case of the black hole that is on the margins of space/time. This is also the case to a lesser extent of a living organism. Their statutes seem to violate locally the second law of thermodynamics. But on the other hand, if the nearby environment reveals an uncontrollable increase in disorder (as accretion disc for black hole, return to mineral state for living), it is only a step in a global process

that will nevertheless lead to the absorption of any form of entropy, no form of energy being able to manifest in an empty space of matter and o EMW.

3. To refer to <u>the third principle of thermodynamics,</u> only a binomial of universe and “anti-universe”, represents a complete system in total interaction. In the state of collapse, this system of symmetries found, refers to the concept of multiverse Cosmos. Temperature and entropy are no longer required.

The quantum thermodynamics cannot ignore the discrete interactions between quantum symmetries. To do this, it is best to consider that particles and antiparticles form entangled wave systems, in monochromatic appearance. For there to be annihilation by confrontation, it would imply that each particle “superimposes” on its antiparticle, a wave packet of equal amplitude and opposite phases (destructive interference). These unlikely conditions today, will be satisfied completely only when all the energy of our Universe will have lost a disparity of states that realized the built matter.

Each quantum symmetry, confined within mega massive singularities about to meet (black holes and by analogy white holes), will then be able to identify with the other in a cooled Universe. We must then consider that each black hole occults a white hole. This one is then supposed to occupy a dimension of space/time in symmetry (superimposed somehow) to the space/time of matter and in which we inscribe.

This point of view must however be qualified as soon as one wonders why a black hole which absorbs more and more energy in the form of matter and radiation, gives the impression of growing. Would quantum decoherence, which results in a loss of information for the observer, obscure the essence of the phenomenon in a reductive vision of it? What we mainly see corresponds to the accretion zone of the black hole. **If the latter can be considered as a breakthrough in space/time, what we call the black hole would locally be an absence of space/time. This would tend to establish that it is the spatiotemporal context in which we necessarily integrate a black hole that creates the effect that it occupies more and more space. How, indeed, to give meaning and quantify in terms of locally unoccupied volume, the absence of space?**

By changing state, the material ends up confined in a black hole. In a possible other dimension to which we would not have access (see chapter XIV), no doubt it would be the same for antimatter. If this were the case, we could assume that there are 2 kinds of black holes: black holes created by matter and other more discrete black holes (also called white holes) created by antimatter. But, we can also imagine that black holes that escape any direct observation are the final receptacle of matter as much as antimatter. Constructed matter (in the state of atoms and molecules) is charge-neutral just as antimatter is. At the atomic scale as molecular, matter and antimatter, would therefore have no reason to attract or repel each other through electromagnetic interaction. This absence of charge interaction between matter and antimatter would explain why the latter does not fall within our field of observation. However, this would not exclude that antimatter, in a dimension of its own, has common properties with matter and notably can share with it gravitational effects which remain particularly unexplained. The countless black holes that dot our Universe, and are not indexable for the most part, would represent in this case the final destination of matter as well as antimatter. It would therefore be the same black holes that would recover the energy carried by matter and that carried by antimatter. It is a hypothesis that has the merit of providing coherent elements of response to many questions and controversies left unresolved.

XXIII The universe in terminal phase

(Before he rises from the ashes)

Heat, change of appearance and brightness describe what our senses perceive and are noted in degrees of dangerousness. It is under these aspects that we discover, through more or less violent phenomena, the behaviour of the components of matter. To de-dramatize this analysis, let us recognize that these indicators only show natural phenomena, counterfeited by the worried look that we give them.

The evolution of the Universe will reduce the frequencies corresponding to the energy transport capacity of EMW. Thus, the high-energy photons will be divided into green photons, then yellow, then red, etc.… (These colors have nothing absolute; it is simply the way that our brain has to put at our reach by the image, waves having crossed a prism in transparent glass). Becoming low-frequency photons, their interactions with matter and electrons in particular have lesser effects. Similarly, fossil neutrinos, whose energy is at its lowest, can hardly intervene with matter. They participate in the diffuse fund, just like photons reduced to the lowest frequencies.
Several grouped red photons will not be able to interact with matter as a single photon in the ultraviolet which alone carries so much energy.
The future of outer space in our Universe would be residual radiation at the extremes of radio waves. This residual radiation will eventually be phagocytized by the MMBH saturated with an energy that now has potential only this qualifier.

The following concerning MMBH can only be formulated conditionally (who can say that astrophysics is a completed science?):

Our contact environment is made of solid, liquid, gaseous matter. These solid, liquid and gaseous states result from the fact that the more or less strongly connected particles occupy more or less the same reference space. The plasma state can have different forms (primordial plasma, black hole exotic plasma, plasma at the heart of stars). However, as thermal and mechanical energy are one, entropy is more or less contained when the particles are in state confusion. In the clean plasma state of a black hole, it would seem that the particles, by losing their properties, are «melting» into a state of which we know nothing

but which we could assimilate, simplifying to the extreme, to a kind of confined, stationary wave without frequency, nor significant wavelength.
Without comparison with the above, the stellar plasma state would be a kind of dense soup of deconstructed electrons and ions, under unusually high pressure and temperature conditions.

A black hole could perhaps also be described as a superfluid plasma in the radiative direction, totally cold, excluding any remarkable interaction and which no longer belongs to the space-time of relativity. We are forbidden to approach such a supposed superconducting state, without significant temperature and in which any phenomenon of resistance disappears.
Anything that passes the accretion disk of a black hole, loses its former status. The particles with whole ½ spin (fermions) combined "unnatural" lose their distinctive properties of quark or lepton, such as charge, spin… Only mass/energy equivalence remains. In a TNMM as in the primordial Universe before the Planck wall, nuclear and electromagnetic forces, can hardly manifest, the gravitational effects are non-existent or have changed nature. **The gravitational effects of the black hole would result from the fact that it creates in the space/ time we occupy, a hole, somewhat of an opening on the Cosmos multiverse.**

It is possible that the content of a black hole is not uniformly homogeneous to the extent that it may have a lower density in its surface. If this is the case, in this shallow layer, movements would continue that would send some particles back to the accretion disc. This latter, by its inertia, then would project a part in the axis of a "truncated" magnetic field resulting from these convection movements.
While acknowledging the speculative nature of this development, a black hole does not, it seems, internally manifest any movement, no phenomenon, no interaction. One would be tempted to consider that a black hole conceals internally, 2 potential magnetic fields (one for each hemisphere), without marked field lines however. These pseudo-vector fields, diametrically opposed, would share virtually the same point of convergence. It is then presumed to be at the heart of the black hole. The extremities of the axis of rotation drawn by the accretion disc would then share a same magnetic pole. The black hole does not emit any magnetic field by itself, it is its accretion disc that creates the dynamo effect.

The reason for this would be that in the “depths” of a black hole, nothing can return to the state of energy field in motion and any magnetic excitation is impossible. The interactions could therefore only be surface phenomena behind what we call the event horizon. Considering this possible specificity, particle jets with X and gamma radiation emitted by the accretion disc in permanent connection with the black hole surface area or on the occasion of the collapse of massive stars, pose question. Is our interpretation of phenomena related to electromagnetic fields and interactions correct?

In response, it must be considered that at very low temperature and under high pressure and density conditions, the atoms stop vibrating and shaking. This is what happens when a heavy metal is strongly cooled. Atoms have less active use of space. As a result, the electrons by leaving the atom are channeled between the nuclei without encountering any obstacles. Molecules drain then, a “stream” of electrons that can flow undisturbed. The latter keep all their energy which, however, cannot manifest in an environment where the nuclei are like frozen and keep their remoteness. In a black hole, it would be the same if it is only that the space needed to move what was the electrons has disappeared. A black hole cannot therefore manifest a magnetic field and its accretion disc neutralizes the electric fields associated with the engulfed matter. We can think that it is the rotating galaxy which takes over this pseudo-vectorial field and leads it back to the black hole through the accretion disc. In this way, the lines of the magnetic fields emitted on the surface of the black hole would return in loop, giving the impression of rotating in spiral around it whose equator, point of convergence of the lines of magnetic field, would act as magnetic monopole.
A black hole would be both:
1. A superconducting medium that cannot have a magnetic field (Meissner effect)
2. Some kind of radiative plasma, exotic in which energy cannot manifest itself, all quantum information being confused
3. A super cold environment in the absence of remarkable interaction
4. A super condensate of energy in the hyper fluid state but no possible flow area

The black holes do not seem to completely withdraw from the effects of general relativity in a space/time that generated them. This would explain that even after passing through the accretion disc, the collapse of matter which has lost its properties (mass, spin, colors....) could not continue beyond a certain critical density of energy involving the absence of empty space. This critical density of the black hole is that of a quasi-stopped time when everything frozen appearance. In a black hole, photons and mass particles are supposed to melt into an undifferentiated state that will find its fulfillment only in the final collapse with return to the cosmological balance. This form of Big-Crunch will restore to the multiverse Cosmos the energy in chiral symmetry (spatio-temporal chirality) resulting from the big-bang. The absence of «interstitial» space in a black hole and any form of interaction makes that in these transition states, at the margin of the space/time, relativistic physics and quantum mechanics lose all meaning.

For the outside observer, time no longer flows through a black hole that can be defined as a singularity out of the observable event that makes our space-time. By projecting ourselves into a "end-of-life" Universe, we would find that the MMBH representative of a cooled Universe can no longer feed for lack of free energy. Its surface interactions will have ceased and any magnetic effect will have disappeared in the absence of accretion disc. What, between them, represented the empty space (EMW + «stardust») will be gone, leading all the MMBH to become one in the collapse of a binary system of universes in quantum symmetry. This non-event (for lack of significant time) could be understood as a sort of Big-Crunch of mega-massive black holes.

Considering its gravitational singularity and the absence of own repository, we could, at the limit, consider that it is not the black hole that is in motion, but that it is everything that tends to reach its horizon. Black holes would be like tunnels about to communicate with each other or as rips in an extreme «depressed» space/time. Their unfathomable hearts will eventually form a common junction restoring to the multiverse Cosmos its latent energy.
When two particles of opposite symmetry, which are supposed to occupy no space, meet, they collapse on themselves as a MMBH confronted with its symmetry in a Universe at the end of life. Our Universe could be seen as a vast black hole in fragmentary formation of which nothing can escape, not even its quantum-origin symmetry.

The idea of wormholes, which would be the prerogative of black holes and would open to white holes, is interesting because in a way it is a shortcut through a space-time that connects Big-bang and final collapse.

In a Universe in "end of life", free photons, now of negligible intensity, are characterized by wavelengths the size of the Universe. In the absence of repository, they reach an almost unlimited light speed that will lead them to join the MMBH in a final «flash», favoured by an empty space free of any physical form of energy. A second-generation Big-Bang will erase the «cold depression» left by what was a binary system of universes in quantum symmetry. One would be tempted to believe that with every big bang, the past is erased to reconstitute itself in a present that will rebuild an ever-renewed future.

We cannot talk about location or movement within the multiverse Cosmos. Any neighbourhood link between binary systems of universes in opposite symmetry. It is clear that these considerations, which go off the beaten path, go against certain firmly established dogmas. But isn't thanks to this kind of challenge that partly how science and knowledge have progressed?"

XXIV Why subtitle this book: tales and legends?

(Would they try to make a silk purse out of a sow's ear?)

There had to be a title related to development. It is necessary to remember that tales and legends are generally inspired by misunderstood or sometime poorly accepted events and where illusion, dream and appearance of reality.

Man has everything of a potential explorer/researcher who ignores himself. This is how we built our Universe from elementary entities called particles. Listed and classified, all are distinguished by a particular ability to interact with and interfere with others.

Although this does not correspond to the commonly held idea, could it however be that all these particles are nothing other than a model unique but also plural, a wave packet in a superposition of potential states? It is the observer's gaze that would determine a chosen state according to the nature of the subject-specific and context of observation. The idea of particles meets the need to describe a certain reality which fits with a progressively acquired logic, closely related to our observer status. This idea of body in relative displacement and endowed with spatial coordinates is the basis of a mental construction allowing to imagine phenomena (or interactions) on the quantum scale. But how to link an elusive mechanics of the infinitely small to observable physical phenomena that make up our recognized environment? Space/time is a necessary framework resulting from cognitive functions of the observer. The context of space/time allows him to give a meaning and a framework for observation of phenomena that affect or could affect him. But that the observed phenomena may result from discrete interactions between particles and antiparticles escapes his analysis.

This problem led to the elaboration of a synoptic table of particles that gives sense to a so-called standard model rather in line with our vision of our Universe. Moreover, the notion of particle allows to escape the hardly malleable concept of wave function. This fundamental concept of quantum mechanics refuses to integrate into our intellect and leads us to build a reality that is in accordance with the gaze, and the feelings of the observer we are.

The particle is then identified in a conventionally defined state by its mass, charge, spin, helicity, colour, flavour…. The wave function for a free electron that would in no way be able to interfere (information sharing) with a positively charged particle, would make charge, a state of this undisclosed particle and therefore purely potential. It is the observable interactions between particles that give them the distinctive state and properties we give them.

The state of superposition that characterizes a bundle of intricate waves (in the sense of a particle) then becomes a matter of context considered as view specific to each observer. **Because of relativity involving the absence of simultaneity as remote observers not communicating, these so-called superimposed states remain unrecognized with the exception of that related to the repository of each observer**. Since the particle's intrinsic property is that it cannot be associated with a space occupation, the spatiotemporal context would depend on the mere presence of an observer confronted with the constructed matter.

Thus, everything that is used to define and quantify the potential energy (speed of movement, intrinsic movements, acceleration, mass, etc.) will be perceived differently without their being aware of it, by delocalized observers. This means that our vision of the Universe is reductive, local and inevitably a question of interpretation. Our analyses the most widely rich in data, of localized phenomena do not give us however, the capacity to consider, on our scale, the profound nature both multiform and undivided of what makes our Universe. Recent advances must not make us forget that to this day we have no more certainty about the origin than about the content beyond the visible (which tends towards the infinitely small and towards the infinitely large) of our Universe.

Dematerializing what we represent for ontological convenience in the form of object or corpuscle proves be deeply disconcerting. In fact, it is difficult to imagine an object, as a group of particles in the inconsistent form of packets of intricate waves, superimposed by states, without any real occupation of space. Our almost insurmountable handicap comes from the fact that our gaze can do no other than locate spatially and circumscribe in time. Our repository (our local space-time) sets our limits, offering us a vision of things whose we are beginning to understand today that it does not allow us to lift only a narrow corner of the veil.

Basically, the list was summed up in 12 mass particles (fermions). Added to this is the photon, a particle without mass, associated with electromagnetic waves and which, by transporting information in the form of intangible energy flows, conducts exchanges between fermions and with their symmetry. In addition, particle-vector bosons are used to explain nuclear phenomena and

interactions between mass particles. But wouldn't it be a response too easily brought by making a parallel with the photon, vector of force for electromagnetism?
As we progressed in the study of particle interactions, phenomena yet prescribed by the advanced state of our standard model and relativity remained unexplained. It is to answer that some theorists have been led to propose additional particles with properties providing elements of response. New particles were added: preons, squark, selectron, sterile neutrino, gluino, photino, graviton, Higgs boson… This ever-growing list, would it testify to our inability to finalize a table of elementary particles?
Should we not return to the fundamentals, considering that the matter particle dresses energy points without dimension, confined out of time and that quantum interactions and phenomena of all kinds actually cover a general process of return to cosmological equilibrium. Stripped of these artifices, which must be recognized that they were essential to a methodical approach, our Universe has little similarity with the commonly prevalent image we make of it.

To return to the strong force:

In order to explain the attachment of the quarks to each other in a structure called the nucleon, it appeared necessary to imagine in good logic an extremely strong link no more observable as the quarks themselves. This reduced range force, which was described as strong, led to the design of a particle classified as a boson of gauges and carrying this type of interaction. Devoid of charge and mass so as not to affect the nature of the quarks, it will be called gluon and developed in 8 shades.

However, this artifice is no longer justified if we admit that quarks, virtual entities in a superposition of potential states, are fundamentally both down and up. Another point which dispenses from having to resort to these gluons would be to consider that the hadrons and more specifically the nucleons, sum of 3 quarks, are not assimilable to a «place» of space and that on the quantum mechanics, time does not exist any longer than it existed or had meaning, before the Planck Wall. It is only on the supra-atomic scale that time integrates with our reality which seems ignore quantum symmetry. However, it is precisely this symmetry "superimposed" that would realize the internal architecture of the nucleons by intervening undisclosed, in the charge «equilibria» internal to these composite particles.

Not all hadrons are stable. The tetraquark, is a composite particle of the hadron family consisting of 4 quarks, just like the pentaquark is composed of 5 quarks and just like the meson is composed of 2 quarks. All these hadrons, which can be subject to variations in their composition, have no useful life and are presumed to be produced accidentally. We could probably also imagine a hadron with 6 quarks that would not have more durability. All these composite particles seem to be exotic anomalies resulting from interactions that do not fit perfectly into an evolution that would be without possible alternatives of our Universe. We can thus create (CERN experiments) «unnatural» hadrons, virtual quantum sandcastles for fun and to satisfy our curiosity. These ephemeral particles are supposed to give us a new light likely to comfort or modify our table of elementary particles. This is, however, to extend a list in which, at the current stage of the evolution of our Universe, only nucleons (stable composite particle of 3 quarks of first generation) participate in the construction of the constructed matter.
One may wonder about the reason why quarks only have survival in groups of 3 in protons and neutrons and the nature of a force that keeps them together. By taking some liberty, this form of triangular singularity refers to our idea of an observation frame requiring 3 spatial dimensions. We can thus say that the quarks by confining themselves by 3, are linked in an ideally close and solidary way in what can be understood as a complex field of energy devoid of occupiable space. Considering the presence of a particular force, called a strong force, allows to avoid the question of substance.

From a given point, Euclidean space can be represented by a volume affecting the shape of a sphere, whether of a given or undetermined dimension. Indeed, the sphere has the particularity of being a closed surface that allows to encompass a maximum volume. Determining the volume of a sphere requires only knowing its radius r by applying the **cubic formula** 4/3 r3. This formula is reminiscent of that used for the volume of a cube, a geometric figure of the most remarkable, concave, regular and symmetrical whose all faces are square, equal and superposable, or a3 is **also cubic formula**. Scalar modulable, any part of space can be assimilated to an object of concave and symmetrical shape. Any part of space can be physically reduced to a certain surface (average surface) of base in vertical extension and can be represented mathematically in the form of equations integrating the product of 3 vectors; to simplify L x l x h (length, width, height).

Can we thus explain the representation we make of the nucleon as a potentially stable 3-component particle? This reference to the sphere and cube may be surprising. It shows that in quantum mechanics and astrophysics, interpretation is often reported in relation to established facts or physical laws. This way of conceiving quantum phenomena is dictated above all by the gaze of the observer and is intended to conform to the logic that it has built. Our reality remains closely related to our ability or not to go beyond the scales of magnitude that set their limits. Obviously, our condition as observers reveals very few things of a quantum mechanics where time and space do not really have any meaning.

It would be tempting to forget that particles are points, in other words mathematical data without dimension. As such, they are not representative of space and ignore the time of the relativity. Quantum entanglement does not fail to remind us of this. On a sub-nuclear scale, how can we speak of distance, distance or rapprochement? We can remain on the same logic when it comes to the electronic cloud of an atom with the electrons that give the impression of sharing trajectories by realizing the charge neutrality of the atom.

The so-called strong force, considered as a binding energy between quarks and nucleons, is supposed to represent the bulk of the energy of a hadron. But it could be more simply defined as an interaction without any real exchange of information, a form of quantum entanglement that would allow particles of the same nature to instantly share certain properties to varying degrees, regardless of any notion of remoteness. Here we find the idea of quantum entanglement.

The completeness of exchanges within a hadron would depend on its stability. In any case, what we see today is the product of a long evolution started with the first radiative entanglements and the appearance in equal quantities of primo particles and their antiparticles. Thus, would have appeared:

- The first neutrinos and antineutrinos

  Then or at the same time:

- The quarks and antiquarks
- The electrons and anti-electrons

When antimatter sometimes comes into contact with matter, both are annihilated feeding the energy of the vacuum. The energy that was carried on the one hand by matter and on the other hand by antimatter does not really disappear. Nothing is created, nothing is lost, everything is transformed.

Antimatter could be a possible component of what we call by default dark matter (see chap. XIV). When the conditions are met that put «in presence» matter and antimatter, a part of the energy that results from these confrontations turns into radiation which are devoid of gravitational effects and also incidentally in new particles. The antimatter can only have a gravitational presence when it is not direct interacting with its associated matter. Under these conditions, it remains exempt from any type of observation, which would raise a problematic antimatter deficit. Only its gravitational effects would indicate a presence not directly observable. Doubtless, anxious not to question a standard model that has allowed many advances, the unexplained gravitational effects observed inspired by default, the idea of a so-called dark matter of unknown exotic nature. We can make a parallel with the reduction of the wave packet that brings everything back to a recognized physical state, by excluding any other interpretation. An interesting approach exists with the theory of axionic quark nuggets which proposes to define the properties of antimatter in terms of field properties and somehow dematerializes antimatter making it unobservable. The axion, this hypothetical particle of zero charge, of uncertain mass and capable of decaying into gamma photons would be nothing more than an intelligible way to represent the annihilation of antiparticles by coalescence with their symmetrical particles. Such an event, not directly observable, would occur in particular during a supernova. This epiphenomenon too brief for us to be able to distinguish it as such, would occur when the star at the end of its life implodes revealing an exceptional luminosity.

To return to the weak force:

The atomic nucleus consists of neutral charge nucleons (neutrons) and positive charge nucleons (protons). The link that unites these composite particles within the atomic nucleus and that seems to be of a not very different nature to that which connects the quarks to each other, is by convention, considered as assumed by these same gluons. Nucleons can change status, leave, or join a kernel. Thus, in the framework of beta-radioactivity, neutrons can become protons, releasing an electron and «awakening» incidentally an antineutrino. By changing a quark down to quark up to become proton, the neutron while producing and ejecting an electron and an anti-neutrino, could emit a positron (antielectron) and a neutrino that would escape observation. In order to explain these exchanges within the nucleons and their state changes within the nucleus, it seemed useful to imagine relays (or vectors) with a mass and adequate charge. Thus, has been added the idea of Z and W bosons representative of a force qualified as weak by distinction with the so-called strong force. All these agents transmitting information between particles are supposed to correct nuclear " anomalies".

However, another explanation would be to consider the condition of superposition of possible states of any particle. Cloned by virtue of their origin, potentially as identical, these elementary entities would not have a real need to communicate as they are fundamentally configured on the same model. They are in a certain way everywhere at the same time, and everything that affects one of them determines potentially and without delay, at various levels, the behaviour of all the others.

The Universe we know is not the Universe at its earliest beginnings. The original Universe was homogeneous and uniform, nothing can be distinguished from at all. This would explain that some quantum information continues to be shared without apparent moving around the universe. This information, which represents the intrinsic energy of an elementary particle, ignores space and time. It is the observer who dresses time and space (relativity) to try to understand these exchanges between particles. Quantum information is «teleported» in varying degrees without delay, or location conditions, shared and stored forever. From this disconcerting peculiarity of the quantum world, was born the idea of quantum calculator. However, the prowess would be to ensure that these quantum calculations and data are not affected by the hardware environment.

All this amounts to accepting the idea that certain information exchanged between particles do not travel really. which would exempt the use of these gauge particles, the Z and W bosons. It is the quantum symmetry that ensures through mainly the EMW, the cohesion of the nucleons within the atomic nucleus by managing especially the «equilibria» of charge. For nuclear interactions involving electrons (beta radioactivity), the EMW also come into play by making that the

charges are quantified differently for the electronic belt of the atom. These phenomena would bear the signature of the electroweak force (2 forces that make one but are distinguished by the energy levels).

To return to the electromagnetic force:

The atomic nucleus can emit (and also absorb) electrons, thus preserving the charge parity of the atom. By positioning itself on orbits defined by this need for balance of which it is a key element, the electron ensures the stability of the atom. It remained to be determined more precisely what triggered the changes or abandonments of orbit of the electron as well as its movements shared between several atoms and which give their cohesion to the molecules. Applications using electric current led very early to understand how a transmitter agent called photon for quanta of light interacts at all levels in energy transfers. He would get involved in any kind of quantum phenomenon and would not be forbidden. If the bosons of strong force and weak force are there only to give visibility to what we perceive indirectly, as exchanges on the subatomic scale, the same is not true of photons. Representative of electromagnetic force (to make simple; all the energy that is not in the state of matter), they are the very essence of any form of energy and preliminary to all that makes up our Universe.

During a brief period that marked the beginning of the Universe, part of the energy became a particle of matter by radiative entanglement. The free energy that could not be formatted in this manner, into wave packets represents the empty space today made mainly of electromagnetic fields. These energy-carrying force fields constantly interact with the particles of matter and make the link between them and their symmetry.

The strong interactions and weak interactions have led to the prescribing of the presence of related force vectors. But could the addition of these additional bosons not be a default interpretation of electromagnetic interactions that are difficult to explain?

Devoid of mass and charge, photons, corpuscular representation of EMW, interacting with particles/wave packets could be seen as the masterpieces behind all these phenomena that make quantum mechanics.

Integrating gravitation into a coherent overall model would therefore no longer be a problem:

But for this, we must consider that the electromagnetic force is omnipresent in all the recognized interactions between the particles whose tree structure we have designed. Without any charge or mass, the photon (EMW) becomes a major player acting as a privileged mediator.

> Everywhere present and remarkable in energy transfers between fermions, electromagnetic force, would be able to manage the exchanges between quantum symmetries. It is not only what makes the visible light and the electric current. It bears, in a way in itself, the program that will lead to remedy a chirality symptomatic of a rupture of symmetry. Its arbitration will bring our Universe to its end date.

All this can only reinforce the idea that our standard cosmological model that we know incomplete, would need to be rethought. History is only a succession of challenges that shows that "the cosmologists, who quite rarely appear in doubt, -history shows us this- can be sometimes mistaken" (Lev Landau, famous theoretical physicist). Why would it be otherwise today? But are we naturally able to change our gaze? This would call into question a laboriously acquired logic? On this one rests a segmented physics but relatively coherent and above all able to satisfy our curiosity on many points. This reflection, which may seem somewhat surreal in some places, is essentially based on recognised knowledge acquired and widely debated hypotheses.

How to make the part of a real that is particularly discreet, compared to an appearance of reality resulting yet, from observations "common sense"? This question runs counter to our thinking. It becomes necessary to elaborate upon certain points.

- **In the case of the particle:**

If the particle seems to be above all, considered as a waves packet, its presence is often, by necessity of observation, associated with that of elementary corpuscle. The Universe then seems filled with innumerable tiny grains that disappear to reappear in another form. Their movements are in large part hidden from our gaze and they reveal their quantum symmetry only case-by-case.
This same lack of observation means that we perceive electromagnetic waves as a succession of front lines while they would mark countless points of interference with other front lines. *We could draw a parallel with, in meteorology, the isobaric tightened lines which at the points of contact develop unstable zones of friction due to pressure deviations.*

A point represents a tracking in a field of energy. This point, even if it lacks precision in its location, is more telling than that of field or of energy bubble

taken up previously and exchanging with other bubbles. Always this recurring need to materialize by positioning as precisely as possible!
However, what we understand today, about the particle is neither a dot nor a bubble. When the particle seems to disappear from our landscape and if it is never quite the same particle that reappears, what happens in the meantime? Apart from any observation, the particle, which is not a prisoner of time, would be able to ignore the space, like that which crosses the horizon of the events of a black hole. An answer can also be given by changing the context and making a parallel (one more) with what is happening at the macroscopic scale of the Universe. At the «end of life», our Universe, «mega point of energy» should disappear by confusing itself with its symmetry. It is a new Universe, a new point of energy, initially without granularity and probably quite similar to the first, which will be manifested. **Between final collapse and Big-bang, it is the unknown or rather an absence of event that refers to the definition of the multiverse Cosmos. This is how is transformed, in our eyes, the particle which would have a raison d'être only as a sequential revealing of a process involving two universes of quantum symmetry.**

We could also describe the Universe as an imbroglio of spheres of influence, intertwined with each other. This is equivalent to describing a space made of loop-like sharing lines that constantly change, overlap and intersect. This idea of loop is found at all levels: quantum loops, electromagnetic loops, gravitational loops. Everything seems to be in a loop. String theory which leads to a reconsideration of the dimensional characteristics of space, was largely inspired by it. Cordists suggest that elementary mass particles would be made of tiny possibly closed strings and vibrating together. By rejecting the notion of energy point, string theory joins the idea of radiative entanglement which makes the elementary particle a wave system.
In composite particles (mainly protons, neutrons, mesons) the quarks would share out time and space, the intricate waves in packets that they represent. We can make a parallel with electrons when they share several atomic nuclei, realizing the binding force that builds the molecules. A derivative version is proposed in the superstring theory and quantum loop gravitation. These particularly complex theories claim to explain, among other things, the strong interaction by requalifying the elementary particles from a virtual entity common to all.

- ■ **For the Multiverse Cosmos :**

The multiverse Cosmos would like to be defined by reference to the notion, difficult to conceptualize, of infinitely great. Now, the idea of a whole infinitely great necessarily meets that of infinitely small and is supposed to exclude all beginning and end. **In the absence of a cosmic time scale, the Universe therefore possesses temporality only in the eyes of the observer it hosts.**

To put it simply, the best is to imagine in unlimited numbers, pairs of Universes of quantum symmetries who in exchanging internally, make quantum mechanics, without time and space constraints (a way to retract relativity in the exchanges between symmetries). It is also a way of representing a multiverse Cosmos that does not belong to our reality. The concept of discreet interactions between 2 quantum symmetries makes it possible to approach an ignored reality and that hides phenomena not directly observable. At this stage of reflection, it becomes inevitable to appeal to the imaginary with its share of uncertainties and weirdness, even if it is allowed to think that such a conviction constitutes a heresy, an affront to common sense.... worthy of the pyre (history testifies to this).

Our observation tools allow us to discover a vision chosen and specific to each type of observation. Very often, what we discover without always wanting it, raises more questions than it clarifies. This means that out of ignorance, we are reduced to rejecting determinism in astrophysics.
"If you think you understand quantum thinking, you don't understand it," Niels Bohr, one of the inspiring physicists of quantum physics, would have said. This joke makes sense here. Too much complexity, too many misunderstood led us to interpret quantum physics in probabilistic mode. A determinism made of probabilities is a lot of uncertainty. But it does not mean that the future is ruled by the chance. The principle of indeterminacy that reigns over quantum physics reflects a feeling of unpredictability.
A recent and disconcerting discipline, quantum physics would be no more random than classical relativistic physics. Accepting the idea is the prerequisite for bringing together physical laws that seem to diverge. A theory thus unified, would nevertheless remain diversified within the framework of a global approach, by the presence of scales of magnitude that make the big gap.

This probabilism is our way of understanding determinism or causalism in the quantum dimension. Any phenomenon, however complex, produces an effect. This is the inevitable consequence, more or less direct and to varying degrees, of a set of conditions understood as the cause of an event. **But can we imagine that this cause may not be a prerequisite for the event that seems to follow?** In response to this, we must already agree that we represent the past as a succession of circumstances taken as both causes and effects. From this succession of states results the present state. The future that derives from it then seems to us likely to be determined by reference to all that preceded it.

The present, for its part, is an elusive border between a past that no longer exists and a future that does not yet exist. Our present has nothing immediate in the strict sense and belongs to the past even before it is considered. This moving point on the timeline would therefore represent a sequential and reductive image of a transitory period between two almost concomitant observations that are related to the most recent past. The present doesn't deserve its name! Moreover, relativity makes us reconsider the very notion of simultaneity, in a certain way conceals this idea of instant without duration.
In reality, without sufficient data, beyond a very short term and immediate proximity, any forecast can only be fraught with uncertainty.

The time can also be defined as a succession of states.

But by asking the question of what connects each of these evolutionary sequences, we can also say to ourselves that the future determines the present. To do this, we must accept to consider that each of these related states is programmed from the beginning by a logically predictable final state. The final collapse then becomes from this point of view, the generator and therefore the first cause of a whole previous process of deconstruction marked by a succession of states. A certain principle of uncertainty by normalizing our inability to project ourselves into the future in any other way than in the context of hypotheses prevents us from conceiving time in this form. Indeed, it is difficult to imagine that causes and effects may be devoid of temporal direction. This is one of the key ideas in this paradigm: relativity in its last cuts.

The Universe is quite similar to an oversized watchmaking mechanism, made up of toothed wheels, pulleys, drive belts and gears of all kinds, linking times differently according to the toothing of these same gears. Any part or element that is not in the format required to adapt to others, has no place.

Nevertheless, high-energy interactions, governed by strong nuclear force, can incidentally produce all kinds of subatomic particles with the interface role. The fact that they are almost without duration of real life, makes them very difficult to detect. These transition composite particles, particularly unstable, would have for some a quark number greater than 3 (possibly a mesons assembly) or limited to 2. This quantum anomaly without possible extension can only be annihilated by confronting the corresponding anti-fermions. Called exotic particles because of their great potential diversity and evanescence, they find hardly their place in our standard model.

The Universe would develop as self-programmed from the beginning by a destiny traced in advance. This answers the following question: why is the Universe so and why does it not evolve differently? In a rather disconcerting logic, which could refer to Lapalice, the Universe can only be what its destiny commands.
By accepting this form of determinism, we consider that everything is connected and that the Universe has no choice. There is however, an exception to this and we are well placed to witness it. Only a form of intelligence, in other words a living organism conscious of its existence but also convinced of its faculty of free choice, can change the definite course of things. Just roll the dice; what we do on a daily basis. The mere fact of observing, intentionally and under certain intended conditions, an event is not neutral. The collateral effects resulting from this are not without impact on the future of a Universe that would normally not have been disturbed by the «butterfly effects» of arbitrarily imposed choices. However, these effects are insignificant in terms of macroscopic consequences. Leaving aside these few opportunities supposed for free choice that would be reserved for us, the future would be theoretically determinable otherwise than in terms of probabilities, if not the extreme complexity of the data to be considered.
It is for this reason that the wave function is based mainly on probability and random developments. Similarly, the EPR paradox is confusing, when it comes to the speed and positioning of particles, to cite only these two advanced concepts of quantum mechanics. Let us recognize, however, that, for convenience, we tend to think that an excess of complexity translates a share of randomness in phenomena that we cannot explain.

The particles in superposition of states, can communicate out of time because of a «permeability» unrecognized between quantum symmetries.

By interacting in this way in discrete mode, the particles justify the adage: not seen, not taken.

To be more explicit about this difficulty to identify simultaneously position and speed, recall that:

- **The position of a particle** can only be done by reference to other particles. For any particle being in motion, the position in 3D is given at a fixed moment T on a fixed-point P defined in relation to other **stationary** points P', P', P'… The coordinates obtained in this way do not consider the movements, we consider only the distances compared between fixed points. **Time is not considered.**
- **The velocity of a particle** is made by reference to time in a space at 2D or plan, represented by a curved trajectory. Only the linear trajectory of a displacement in a defined frame of observation is considered. Speed is the ratio: succession of positions/in an elapsed given time. It is done in general, excluding the presence of other particles located on other planes. **It is the flow of time that is mainly considered.**

The principle of indeterminacy, improperly called uncertainty principle, reflects the difficulty of accurately locating a point appearing a wave packet. The difficulty increases, as we have just seen, as soon as we try to determine jointly the state, positioning and displacement of a particle, any measure which appears to be taken to the detriment of another. We are therefore reduced to reasoning in terms of probabilities, which nevertheless allows us the laying of milestones in the quantum exploration.

The particles being assimilated to waves, some equations called wave equations can only propose a nonrelativistic approach. The notion of wave function provides a logical but not necessarily convincing answer to this dilemma, explaining that in the fundamental state, a quantum whatever it is, would be only in superposition of all its possible states (position, speed, behaviour...). How can we understand this, knowing however that nothing we are given to approach in any way is static, stable, definitive, absolute?

Once it turns out to be interacting, a quantum only reveals a partial state, the one we are able to observe. And who can doubt an obvious "too" reality? Any other state remaining hidden, the wave function finally proposes to the observer, a single state determined, in a certain way, by the look of it. Indeed, any form of observation by being more or less introspective for the «object» of curiosity, makes it leave its state of superposition (see chap. XXIX). The observer is part of an open system of proximity interactions. It is part of this system and interacts by its only active presence on the quantum state of matter that it is given to observe in its near vicinity. This is what he does especially with particle detectors and accelerators like the one at CERN, despite the devices meant to remedy this.

All particles would possess a same superposition potential (cf. the EPR paradox). All may, occasionally appear to us in a state of preference, dictated by the observation of a phenomenon and the most apt to satisfy the conditions of its realization. Unlike radiation that interacts locally with mass particles, the quantum information that makes up the essence of the particle (spin, charge, energy) does not appear to move in space. It would be, to varying degrees, shared between particles with a same origin.
The ability to share information as part of quantum entanglement is due to the fact that particles due to their common origin (Big-bang) retain an unbreakable bond. This acquired correlation, which unites particles into a system, is all the stronger since the intricate particles have recently distinguished themselves from each other.
If we consider that all particles of matter share the same quantum “DNA”, all would be more or less correlate with each other. In this concept of non-locality specific to the quantum dimension, determinism and causality are not questioned because these 2 logical principles by reference to time and space so familiar to us, have no real meaning in quantum physics.

The photons are all intrinsically and definitively linked, because from a period native to the Universe where time and space were not significant. Photons therefore remain linked to each other even after split, to the point of being able to instantly exchange without being physically connected. The photons having no mass, move at a speed that no other particle can exceed. Given this peculiarity, time ceases in fact, to pass for the photon (except for the observer/witness we are). This means that the photon is not required to respect the distances and speeds of movement that define what we call space/time. If we consider that all particles come from the same «non-event», starting point of our Universe, we can think that this property of non-locality is not an exclusivity of the single entangled photons. It would be the same, to a lesser extent, for particles of matter having shared the same local context. But for them, the notion of localization in a relativistic space/time would be justified by a fact of degradation of quantum entanglement, i.e., by the loss of common properties. It is not surprising that certain molecules of the same origin and sharing common properties, are likely to reveal an unrecognized form of non-locality. We thus link quantum physics to relativistic physics of gravitation.

The faster a vehicle goes, the faster we have to estimate its position at a given moment, considering that its location changes more and more quickly.
To determine its position, we should stop the time or at least slow it down, to take the measurement. In the case of a very fast movement, the time required to locate it is insufficient. In the extreme, an object imagined at a speed close to that of the EMW, would escape any attempt to measure making its position uncertain. In quantum physics, when it comes to particles moving close to the speed of light (like neutrinos and free electrons), we understand the difficulty of determining at a given moment, the possible position of a particle and its quantity of movements. It is this impossibility which reinforced the principle of non-locality with that of uncertainty and led to thinking in terms of statistics and probabilities. We must admit that we have neither the capacity nor the tools to know them simultaneously by coupling measurements such as velocity, trajectory, position, total energy carried by a particle. Everything becomes a matter of probabilities and more or less arbitrary statistical average values.

If the cause of a phenomenon is ignored, the phenomenon will remain imperfectly understood. So, in the same way that the mechanics of bodies in space could not be explained properly until relativity was discovered, this superposition or indeterminacy of the possible states of the particles seems to reveal our ignorance of another context, difficult to imagine and just as decisive as relativity. **A chiral symmetry not open to the observations, would explain that all the exchanges of energy are perceived as being in successive packages or stages and not in a continuous way.** This sequencing is due to the «protean» state of the particles and would imply a buffer zone of exchanges between quantum symmetry which escape any observation and are difficult to integrate into the physics of the infinitely small yet insufficiently explored.
It should however not be inconceivable to know at the same time, the 2 information of position and displacement. This would amount to describing the movements of a trajectory relative to those of other trajectories. Let us admit, however, that this is not simple! Moreover, to consider a particle as a wave packet, this amounts to considering the movements of energy fields that are difficult to transpose mathematically. The process becomes complicated.

The principle of uncertainty reveals our inability to gather a multitude of information presumed concomitant and that are not distorted.

But, can we really talk about concurrent events in a Universe where everything is relativity?

Any body has a constant acceleration motion whether it is positive or negative. In a space/time of incessant energy exchanges, one can think that there can be no rectilinear and uniform movement. Body mass variations shape space/time, excluding the very idea of conjunction. The gravitational effects associated with them somehow, pixelize the Universe into an indescribable interlacing of reference frames that make the relativity of space/time. But "pixelating" does not mean cutting space: any mass imposes its gravitational effects concurrently and in an additional way on all the other masses of the Universe. These reciprocal interactions between objects and between stellar systems are related to their masses and distancing. This synergy gives time a fluctuating and relativistic dimension. In this idea previously developed by Mach, relativity makes that position, direction and speed of movement becoming elusive, would be matter of interpretation. Any value is based then on an analysis specific to each observer. In quantum mechanics, where the idea of value eventually fades, determining position and velocity will be to the detriment of each other as measurements tend towards more precision (Heisenberg's uncertainty principle). Heisenberg's uncertainty principle stems from the fact that the wave function (mathematical formula capable of providing information on the position and velocity of particles) does not refer to a physical wave. In the absence of a space/time context to refer to, its value can only be probabilistic. It seems that the concept of space/time is fundamentally inherent in the presence of an observer and pertains only to him. Unfailingly linking space and time is the basis of a recognized and validated general physics. The problem is that at the macroscopic scale after measurement, a quantum system sees its state related to the one the observer is by nature best able to understand. This degraded vision mode, called quantum decoherence, means that of all possible states the one received by the observer is truncated because it is reduced to certain properties that are accessible to him. All the states, all the properties of the phenomena that are offered to his gaze are not likely to be primarily recognized by him. Yet we persist in wanting to think about quantum mechanics based on Einstein's general relativity of space/time. Does this mean that the idea of a unified cosmological model is not really appropriate? No doubt we should consider that the physics applied to macroscopic phenomena (those of constructed matter) is not of the nature as we have conceived it and practice it to explain the transition between wave quantum mechanics and the macroscopic corpuscular world as perceived after reduction by the observer.

Two observers distant and therefore not sharing the same time and space repository, will not be able to have the same analysis. For each observer, the topography (dynamic curvature of space/time) of the universe supposed to give the image of a distant past, will be perceived differently. Any observation is therefore tainted by the effects of relativity and offers us an addition of staggered images where the events of the distant past mix and are impacted by the present of proximity.

No doubt we should approach this reflection in a less «conventional» way and speculate squarely on hypotheses that may seem outrageous to a certain pragmatism riddled with convictions. To do this, we should consider our reality as a "misperception" based on a narrow and subjective interpretation of what makes us who we are.

To illustrate this point, imagine a supercomputer, a robotic copy of the human being. To this machine would be connected sensors identical to our senses:

- *A detector/analyzer/microphone: to analyze sounds and odours (smell, hearing)*
- *A thermometer: to record changes in temperature (touch)*
- *A scale: to compare masses and densities (relative to space)*
- *A chronometer: for the chronology of events (causes, effects, durations)*
- *A photoelectric cell: for the analysis and intensity of colours and distances (vision).*
- *A microscope to probe matter and other observation devices*
- *Any other data analysis tool ...*

All these sensors would transmit their data to a central program that should logically be able to analyze them differently from our brain, without the slightest subjectivity. In reality, whatever we do, this software will remain marked by the footprint of the observer who designed it. Subject to a particularly elaborate treatment and confronted with our pre-recorded rules and postulates, the information will be well decrypted, but in what form? Waves and particles do not really have colors, emit neither sound, nor smell. They do not feel any sensation of cold or hot, change mass and density, transform the speed of movement in mass and free themselves from distances by relativizing time and by changing state.

The computer is designed to decrypt differently from its designer. But it captures signals and energy flows in forms that its software, deprived of our feelings, are in trouble to interpret. How can he build a model that is *understandable to us, based on incomplete data and mathematical languages that we ask him to translate into intelligible terms of feelings, in order to restore them to us?*

Nothing should be concretely conceivable for the recorded logic which is his, copied on that of its designer but therefore not objectively appropriate to the processed data.

A computer is inspired by cognitive processes that are the basis of our thinking logic. In these conditions, how to design an artificial intelligence that relies on other algorithms and programs than those designed and processed by our brain. These registered processes to selectively process information, lead us to sort out but also to privilege certain information subjectively when it is not arbitrary.

If we could design a quantum computer powered by high-performance artificial intelligence (AI) and capable of translating in an understandable way, all these phenomena in their complexity, we would have reached a level of technology and reflection that is out of all proportion to the one we know. It would still be necessary to stabilize this computer, theoretically conceivable, by making it impervious to the background radiation omnipresent in space and those emitted by the materials themselves. Probably we will limit the quantum functions to certain parts of the processing process in a conventional computer programmed to try to correct the «noise» and tenders of quantum computing.

The whole difficulty of designing a computer with quantum functions is due to the fact that in quantum physics, the locality principle which induces the separability principle seems abrogated. This principle of locality which governs the macroscopic world of matter constructed by assembly of atoms and is explained through the classical relativistic physics, is what offers itself to our gaze. Our reality finds its fulfilment in a phenomenon of which we have no awareness, called wave packet reduction (see chap. VIII). This new theory of quantum decoherence coupled with that of non-locality poses us a nearly insurmountable problem in so far as it prescribes that our reality would be an optical illusion, a point of view which is unique to us and would fall under a scale effect. Thus, the Universe reveals only what our condition of observer leads us to conceive at a macro level of observation that is not at all representative of a deeper reality where time and space must be left out. This is what makes the idea of quantum computer and artificial intelligence a major challenge that if it leads to some practical applications, will somehow bridge the gap between quantum mechanics and classical relativistic physics unless these new tools take over our destiny. We would have arrived then, to the point of testing and controlling in part this unavoidable wave-packet reduction that today is an obstacle to such progress. Undoubtedly, we will be led to design algorithms of a new kind, capable of deciphering, selecting and manipulating without destroying, quantum information that makes the hidden properties of these gateways to the quantum universe that are wave packets. This would be a particularly promising tool, especially for combinatorial calculations. It will still be necessary to finalize these operations carried out with qubits, by an intelligible reading of the quantum values obtained. This implies being able to remedy by a process of decoherence to imagine, the state superposition that makes the probabilistic nature of the wave function, this fundamental concept of quantum mechanics.

The problem is that even at ultra-low temperatures, the atoms that host the qubits are not completely stable. The risks of error in such a quantum system are therefore not negligible. They are all the less so because the transactions are complex and cumulative. This requires to perform a maximum of times, each operation to retain the result that is repeated most often. But here again, this method remains statistical and therefore cannot be considered as totally convincing. Moreover, will a conventional binary computer probably remain necessary to manage by algorithmic filtering the quantum data and translate them into usable result. But the path is mapped which should lead to a more efficient next generation of computing.

Countering quantum decoherence would imply the absence of any disruptive environment and would require absolute vacuum conditions (0 temperature, 0 entropy, 0 radiation although the data for the quantum calculator can hardly be neutralized of their incident effects). Is that the realm of possibility? Decoherence seems inevitable. It does, however, to confront quantum phenomena with the macroscopic world that makes our reality by meeting some of our needs, especially in the space, medical, digital fields...

In the meantime, the idea has been advanced that the Universe would be the support specifically and exclusively intended to enable us to erect ourselves in consciousness of it. This anthropogenic principle
claims that man, epiphenomenon without more future than his close relative, the monkey (yes, yes!!), justifies such an environment that surpasses us in its complexity. However, few things distinguish us from this primate except

for increased longevity and a slightly more structured brain. This allows us to better memorize (in particular less visual memory but more logical memory), exchange and manipulate information. Sad privilege that makes man the first predator, with a well asserted ego. This ideology, centred on the human being, is for some to imagine a “supreme will” which would be the instigator of this plan far from being won in advance. It is to evoke an old fantasy that rallies even some scientists. Indeed, it claims to explain, reassure and value all life with a central nervous system that makes it wonder about its raison d'être. In man, it is a constant that nourishes his unconscious.

XXV Our Universe is discreet about its age!

(No marital status: no birth certificate)

In any direction, our Universe gives the impression of accelerated expansion. This means that, exponentially, for every second that passes, more time would be needed to reach a point, ghost of the past, which is moving away from us, more and more quickly.
In fact, the dilatation of time, prescribed by relativity and gravitational effects, modifies our perception of distances and movements in the distance, concealing an age for our Universe (where is coquetry be housed?) which is probably, out of proportion with the figures advanced by many scientists.

In the light of a supposed expansion, we tend to want to endow our Universe with a marked limit: nothing is less certain. It must be recognized that the idea, repeated here, of Universe not really expansionist, without loophole, circumscribed although not bounded, is difficult to accept. Should this idea be excluded? Recall that relativity was far from unanimous when it was proposed by A. Einstein which, moreover, did not initially adhere to the idea of an expansion of our Universe.

The Big Bang would have happened, it is said, 15 billion years ago. This figure was calculated from what we understand to be a certain speed of recession of the galaxies and trying to go back in time until a time 0. This method of calculation places us in the hypothesis of a Universe born of a dimensionless singularity. Whoever it is, this singularity that swells suggest the idea of a spherical volume and therefore induces a delineated periphery that would not cease to extend from this supposed «central point». Such a configuration does not seem to go, however, in the direction of a Universe globally isotropic and homogeneous. For a Universe in energy space depression as predicted here, this inflationary approach is no longer appropriate and the age of our Universe can seem largely undervalued. The Sitter space model, which would support the equations of general relativity, retains the hypothesis of a continuous expansion. How could it lead to give an age to a universe presumed without finality and of unknown origin, called fault of better, singularity? When observing the most distant galaxies that would like to give us an image of what our Universe was in the past, the clusters of galaxies and therefore the fusion of galactic black holes seem to have been more frequent than they are in our proximity present, which would tend to validate the concentrationary evolution of a Universe in space depression.

The radius of the observable Universe is estimated at 46 billion light years. This distance corresponds to the time of transmission of information beyond which we cannot go back further and which are supposed to be no able to travel faster than the speed -all relative- of the light.
As an impassable limit, the light-speed serves as a measuring standard for everything that moves fast. For an expanding Universe and from this picture routed at light speed, of the discernable limits of it, we might think that 46 billion years would have elapsed. But do a year or a second as units of measure have the same meaning today as in the past? We are led to want to report the speed-light retained in these figures, to the Universe in its current energetic and gravitational configuration. But we must remind that we are talking about a distant past where space was otherwise occupied with a least gathered matter and where time was less dilated. In its early days, the Universe presented an energetic occupation of the so-called empty space more finely distributed, less densely localized than it is today. The presence of stellar bodies that were particularly massive and more concentrated in the distinct galactic system was not so marked.

The light-year (distance travelled at the speed of light over 12 months) is a relativistic data that can only be calibrated depending on the age of the Universe. Difficult in these conditions to assimilate this latter to a constant of length knowing that far space means space of a past time. We cannot make a correlation between an observable radius of 46 billion light-years, the speed of a recession understood as an expansion and an assumed age of 13,8 billion years. The idea of a non-expansionary Universe in retrograde dispersion, more relativistic than radial (see illustration), avoids having to ask in this form, the question of the relationship between the age and the size of the Universe.
Too many unknowns and a failure of data remain to establish with certainty the birth certificate of our Universe. It is therefore not surprising that there are some inconsistencies in the analysis of spectra of remote origins (Redshift) and in relation to previous computational hypotheses based on Friedmann’s fundamental equation which predicts a globally homogeneous and isotropic Universe.
Moreover, the fossil radiation at 2.73 kelvin does not explain why galaxies could have formed so quickly if we remain on the idea of a Universe of 13, 8 billion years and that the year is an invariable unit of time.

As for determining the age of the Universe from the particularly long half-life of certain radioactive isotopes, this process does not consider the fact that the

elements taken for reference may very well be the recycled product of previous radioactive matters.
We have no idea what our unbounded Universe represents in its entirety in relation to the observable portion. **Let us recall that our vision of the Universe at any time was always excessively reductive.** It is safe to say that it still is. According to the standard model, the life of the proton (up, down of first generation), like that of the electron, would be, except nuclear accident, at least several thousand billion of billions of years. If he really has not more than 13,8 billion years, our Universe still has beautiful days ahead of him. Unless he is probably already very much older than he looks. Its longevity would then be tested by all our prognoses. In any case, there is a margin.

We willingly represent ourselves, the Big-bang as the explosion of a very big firecracker dispersing contained and containing following the most direct trajectory, that is to say that represented by rays starting from a supposed point of «firing» towards all directions of space. Energy in broken symmetry, giving the appearance (involving the gaze of an observer) of being multiform is undoubtedly the simplest and most succinct way to define our Universe without having to attribute it for so much, dimension. **This shortcut allows to consider that the Universe was created without regard for volume and not from a singular point that would have started to swell?**
This begs the question: Where does the observer we are fit within our Universe? Impossible to answer. The only thing we are pretty sure of that confirms the above, is that a center of the Universe does not exist anymore than an accessible edge that would mark its limits.

How do you understand that?
We know that it is the matter or mass of the bodies that generates the gravitational effects. We also know that gravitational attraction (which is supposed to find here, its development in electromagnetic interaction) is like the latter of unlimited range and its intensity decreases with distance. This amounts to thinking that once crossed the supposed unmarked limits of our Universe, matter being no longer present, no quantum interaction is detectable. For some, only electromagnetic waves could free themselves from the influence of a Universe (recall chap.) whose scope of gravitational effects is the measure of a Space/time circumscribed but not limited.
In other words, are we ontologically, in the capacity to imagine this elusive border and connotation of infinity, between our Universe and a multiverse Cosmos? For those who think that our Universe would be of infinite

dimension although resulting from an inexplicable first singularity (the Big-bang), to represent it is not easier.

The disorder characterized by curved, changing and uneven trajectories will eventually disappear, the interactions of constructed matter being called to decrease. **Relativistic dispersion thus becomes, progressively more and more tangential.** Speeds are no longer really liberating and trajectories tend to adjust more and more on the curvature countless devoted gravitational horizon. Grouping and merging of black holes will be almost the only remarkable events in a cooled Universe.

Black holes without excluding themselves from our Universe, do not occupy space. Our Universe can therefore only evolve towards a minimal dispersion of the energy carried by the EMW in a space increasingly empty of any other form of energy. This is how we assimilate the energy-poor space with more space to travel between these points of concentration of matter, future MMBH.
All this explains why the galaxies observable at the farthest horizon, seem to move away from each other at supraluminal speeds. This optical illusion results mainly from the fact that our observations are not really corrected of the effects of relativity that should be related not only to the spatial configuration of our Universe but also to its concentrationary evolution.

XXVI <u>An open secret</u>
(Engraved in the past and that seems within sight)

Let us go back to this problematic between accelerated expansion and retrograde dispersion by taking a few definitions first:

- Related to a present in relation to local events.
- **The observed space** is a «static» model as can be a photo, representing a present that can only be of proximity and mixed with a past flashed in a counterfeit distant.
- **The present time** refers to our very, very short term, in a volatile environment of extreme proximity not very evocative of its history.

- Related to an evolution that we would like to reconstruct from the image of a distant past
- **Gravitational space** is an energy medium revealing a generalized unifying process.
- **The passing of time** brings together the degraded photography of a past where the energy showed an accelerated dispersion with a speculative projection into a concentrationary future.

Our present time continues to slow imperceptibly. The time of the past flowed faster to travel through space animated of lesser gravitational effects. It is therefore not surprising that the distances observed in the past and reported in our present time, seem to us all the greater as this past is distant from us.
The depression of space is not a blatant phenomenon to the observation of the distant. However, the depression of space that we observe in a time spent where matter was more diffuse, had to be both more "levelled" (or less "dug" locally) than it is today.
In addition, to speak of expansion refers to the notion of change of size as volume of occupation; more difficult to reconcile with the idea of a Universe without identifiable perimeter.

Today, the observable Universe shows us its limits. But what will the observable Universe be in the future?
If we remain on the case of an expanding Universe, the most distant part of the universe observable today, will then no longer be visible.
On the contrary, if we consider that space is in constant energy depression, the observable horizon today should remain unchanged, except to consider that the

metric (multi repositories value that considers the distribution of energy and the amount of matter in space) changes our field of vision accordingly.

Temperature drops and shift to red (or Redshift) are signs of an space depression in conjunction with time dilation. The hypothesis, commonly accepted, of an endless inflation from a so-called singular event, is based on a physics that shows points of disagreement with distant observations and the analysis of the diffuse fund. Observation and assumed physical laws governing our Universe have shown that they are not necessarily in agreement; this observation is nothing new. Thus, by extrapolating on simulations of the curvature of space, and always in the hypothesis of an expanding Universe, it has been proposed that this one in its entirety, would represent probably a volume of space 15 million times more important than that of the observable Universe. In any case, a supposed expansion as well as a presumed dimension assigned to our Universe cannot be related to any containing or broader set that would be however the only reference base likely to lend credibility to these two evaluations. For lack of acceptable units of value, everything becomes speculative.

Hubble's constant, a recent cosmological parameter, is supposed to help define value scales which would be enabled to assess the size and the age of the universe. To do this, this constant establishes the ratio between the distance and the escape velocity of the observable galaxies; two data subject to caution considering the above.

Indeed, recent observations made using the Hubble space telescope have made it possible to remeasure with a lower value, this Hubble constant, in a way totally independent of the two previous methods which moreover remain in disagreement between them. One used cepheids and supernovae (see chap. XIV), while the other was based on the analysis of the cosmic diffuse background. In the meantime, other observations revealed a faster acceleration than predicted by previous models. These discrepancies, considered as simple measurement errors, could ultimately reveal a size flaw in the standard cosmological model, for the reasons expressed above. A too easy answer would be to return to the very convenient idea of a mysterious dark energy.

The problem is that the standard cosmological model is based primarily on data resulting from measurements of the cosmological diffuse background, with a Hubble constant lower than that measured in the local Universe. As if the rate of expansion of the current Universe was too great, compared to what it should be according to the standard model. No wonder when we know that this model is based on the study of a distant past whose image we can hardly update. The cosmic diffuse background is not really the fossil radiation of the beginnings of our Universe but rather the current result of all the interferences that from the Planck wall do not cease to modify the radiation flows that bathe space and interact with matter and …antimatter.

All in all, in the hypothesis of an expansion of the universe, it proves to be too fast to be adequately explained by current physics. The Hubble constant that we would like to link to the rate of recession of galaxies, could be at most an indicator on the level of energetic depression of space.
When looking at RFC emission peaks, we see very small local fluctuations in density in a uniform and homogeneous universe on a large scale. The low-pressure digs of the so-called empty space correspond to zones of low energy density that reveal longer wavelengths. In the so-called empty space, pairs of particles and antiparticles are created and annihilated permanently. Casimir's experiment illustrates this virtual dynamic of a quantum vacuum that induces the idea of three-dimensional space and a temporality of what happens in it. In fact, the electromagnetic fields because they are reduced to certain wavelengths between two uncharged conductive plates, very close together, put the space that separates them into energy depression. In this configuration, the plates tend to move closer together, suggesting the presence of an attractive force that does not exist as such.

Any fusion of black holes, any supernova, any collision of galaxies creates zones of energy overload with digging of their reference space. It is not certain that this be enough to reconsidering a certain homogeneity of the Universe taken globally.

These disparities indicative of more or less depressed areas, proceed from the same process as the evolution of stretched concentrations of galaxies in honeycombs that we observe on a very large scale. It would be the same for antimatter whose presence is revealed to us mainly through gravitational effects and point annihilations of particles. The Big/bang is therefore not necessarily the idea of a point of space or singularity that would have concentrated at its beginnings, all the energy of our Universe. An inflationary Universe created without initial volume would likely have different concentric density levels. However, nothing like that has been found. A Universe supposed to be expanding from a point of «firing», could be compared to a supernova by its magnitude and violence. An explosive phenomenon of this nature evokes a content in dispersion and a volume in expansion relative to a reference set (region, galaxy, clusters, etc.). However, the product of a supernova is not homogeneous and uniform, the densities varying according to the distance from the point where the dying star was positioned before its disintegration. And how to speak of expansion for the Universe if it cannot refer to a broader context.

XXVII Exploration-fiction in a forbidden dimension

(Or how to push the boundary markers)

All physical laws refer to a defined scale of application, whether quantum, atomic, stellar or galactic. Can we say the same for what, in all discretion, plays with the porosity between quantum symmetries?

In this discrete context, predicted here, at the base of quantum physics, each symmetry is seeking its opposite symmetry and is defined in relation to the latter. It is impossible to concretize otherwise what makes sense, on one side or the other, only related to its symmetry.

Quantum physics is based on 3 rules considered fundamental:

1. Any particle has an antiparticle. Potentially, there would be as many antiparticles as particles.
2. The 3 directions of space would be reversed: this satisfies the idea of space without defined center or edge.
3. In the absolute, time could flow in the opposite direction: This supports the idea of a plural time, consequence of relativity and the hypothesis of a final collapse with return to the initial cosmological equilibrium.

This triple parity in symmetry, known as CPT symmetry, is not questioned in this reflection, insofar as:

- If strong force and weak force seem to violate the CPT parity, it is because an alteration called chirality here by playing with this CPT symmetry, is not alien to gravitational effects.
- The reason for a particle of matter being to be entangled with an assigned antiparticle.
- For a universe and its “anti-universe” in retrograde dispersions, the 3 directions of space can be considered reversed by mirror effect.
- The evolution of our Universe leading to a predetermined final collapse and therefore predictable in theory, reverses the passage of time (cause and effect, beginning and end may be substituted).

The symmetry CPT (C for charge inversion of charge, P for inversion of the 3 spatial coordinates or parity, T for reversal of the sense of time) gives a mirror image of our Universe. It makes of antimatter, the opposite reflection, in equal quantity, of matter. To find a violation of this symmetry would amount to a finding of insufficiency of antimatter. In this regard, the behaviour and nature of neutrinos in the weak interaction may suggest that C P symmetry is not always respected. In fact, resulting mainly from certain properties peculiar to neutrino and remained misunderstood, such a violation was not really highlighted. As for the T symmetry which remains unobservable, we could consider that the inversion of time is in the return to the cosmological balance that makes the evolution of our Universe.

- Symmetry C finds a substitute in the search for a charge equilibrium (by recombination into the primordial Universe and electromagnetic interactions) between mass particles of the same symmetry.
- The symmetry P or mirror effect by inversion of spatial coordinates characterizes a tendency to remedy a certain chirality of symmetry by implication in particular of the weak force. This chirality cannot, however, be considered a defect of symmetry in the classical sense.
- The symmetry T by inversion of time represents the concentrationary evolution of our Universe leading to a predetermined final collapse: a Big-Crunch that would have «sponsored» since the Big-bang, all that preceded.

Constructed material and constructed antimatter are not “miscible.” They share the same Space/time only by a kind of offset mirror effect. The characteristic of this symmetry is in the ability of particles to annihilate themselves with their antiparticles by releasing the electromagnetic radiation they carry and confined during the period of radiative entanglement of the beginnings of the Universe.

In the context of certain weak interactions, electrons and neutrinos may show a left helicity. Some experiments suggest that the equivalence of interaction times between quantum symmetries is not always respected. But does this mean that there is a violation of the CPT symmetry as we might think in view of the disintegration of B mesons? The mesons are exotic composite particles formed by a quark-antiquark pair, therefore of neutral charge and whose life is particularly short. The difficulty in interpreting these apparent violations of symmetry is that antimatter is not observed. These anomalies could be explained in the end by a certain dissymmetry called here chirality, between matter and antimatter. The difficulty in interpreting these apparent violations of symmetry is that the antimatter is out of sight.

The intense gamma radiation detected at the center of galaxies could be indicative of greater exchanges between matter and antimatter. We find these interactions between quantum symmetries in the context of certain nuclear reactions causing annihilation particle/antiparticle with transformation of their energies into photons mainly.

The fiction developed in this chapter, projects us into the depths of the extremely small. It does not change anything that was developed previously and is based on a process of reconciliation between quantum physics, relativistic space/time and concept of multiverse cosmos. It is based, for that, on discreet exchanges that would put in osmosis our Universe of matter with its symmetry.
There is no clearly defined border or prohibition between quantum mechanics and relativistic classical physics. Simply put, the rules of the game evolve to the point of "watering down" when moving towards the "infinitely" small or the "infinitely" large.
The most accurate observations and the best algorithms reveal to us today, too little that we can make certain of.
The physical laws for particles, molecules, bodies and stellar structures, in a context of quantum symmetrical universe binary system, are necessarily related and inseparable. Would not talking about incompatibility reveal our difficulty in making these connections due to over-segmented physics? Although unifying does not necessarily mean giving up segmenting.

A theory of the whole, or unified theory, presupposes rules, in relation to each scale considered but not without extensions and transitions between them. These rules can only be evolutionary in the sense of a global process of reconstitution of a cosmological balance. This could lead to a rethinking of physics (structure and mechanics of bodies and particles) more in the light of the evolution (origin and destiny) of our Universe.

As already mentioned, our vision of the Universe is corrupted by the fact that the **depression of space** is perceived as a lengthening of distances in a mistaken understanding of **past events**. On the other hand, the **dilatation of time** is not consciously felt as a slowdown in the course of **future events.** We believe we are able to travel through space and move through time by observing the distant past. We can in fact hardly detach ourselves from our present local repository, what constitutes a hindrance to the understanding of our Universe.

Quantum mechanics ignores relativity. Intra-nuclear exchanges between quarks occur without displacement, outside of time. Any information carried by a quark, is likely to be relayed and stored simultaneously, by

other quarks. Out of the space-time context, the elementary particles thus would exchange without delay, making believe that they are everywhere at once. It is the situation of electrons that delineate a kind of free zone around the atomic nucleus and serve as a sort of horizon of events for the atom.

Our vision of the Universe is limited to what happens between the smallest recognized constituent of matter and the observable horizon (Lapalisse would not have said otherwise). **<u>It is the idea of a circumscribed</u> Space which neglects to consider on many points what escapes direct observation.**
We can only imagine the Universe beyond an observable perimeter and it seems that we are reduced to doing the same with the content of elementary particles. These latter mark the limit of what we can introspect. Moreover, none is directly observable. Coming mainly from mathematical necessities, they bring to our reach the in-depth understanding of events which make our reality. Smaller than the particle, again, everything remains a matter of convictions.

We should probably consider the photon as a residual energy field of the radiation entanglement phase prefiguring the Planck era. Today, the energy intensity of EMW is beyond comparison with what it was at the origin of our Universe. This means that the photons, quanta of energy associated with electromagnetic waves, are no longer able to entangle with other photons to design new particles of matter. The photon can be seen as a metaphorical representation of an elementary electric and magnetic field, devoid of any measurable dimension. This would likely imply that our Universe has no insurmountable limits for EMW imagined outside the range of charged particles and in some way on the edge of space/time. Nevertheless, for mathematical convenience, we can only estimate the intensity of a photon by relating it to a unit of surface and a unit of time. The fact that our view must change as we scale up translates well our difficulty in making the link between quantum and classical physics. Unconsciously, we practice the mixing of genders.

Since it is understood as a packet of waves representative of the very beginning of the Universe, the elementary particle of matter seems to be unable to be associated with any occupation of space, nor possess measurable temporality. By bonding constructively, some elementary particles (quarks) will form strong interaction composite particles. These complex particles or hadrons do not seem to be spatially and temporally positionable. By achieving the charge balance with leptons, some of these composite particles, grouped in nuclei, will lead to the formation of atoms. Only at this stage do we begin to sense a reality that is unique to us within the framework of a proven physics, involving spatial dimensions and a series of events linked from cause to effect. The atoms, by making the matter built by constitution and assembly of molecules, will shape space/ time relativity. In other words, space and time are the macroscopic product of a quantum mechanics that rejects the idea of occupation of space and temporality. This gradual transition by change of scale, leads in the end to give a framework perceived as the only and unavoidable reality to the observer that we are. We can only adhere to it, integrate into it and build our biotope from a space/time that gives context for everything we are able to grasp. At the risk of disappoint, the human brain is obviously not designed or evolved enough to represent what is really the mechanics of the infinitely small and its quantum symmetry.

On the "elasticity" of time

Is there a way to move himself in the time? The theoretical answer is based on two totally invented hypotheses, inspired by Einstein's relativity:

- Traveling in the future: We know that the stronger the gravitation, the slower the time for any event that is subjected to it (point of view of a distant observer). With the consequence that everything that is trapped by gravity in a black hole, comes out of time (and therefore also space). To extract oneself from a black hole for an observer who escapes without having aged, would be to discover a Universe several millions or billions of years old, with the risk of disappearing if this one by coming to its end, were to collapse. **In this case, we are talking about a theoretical journey into the future.**
- Back to the past**:** the final collapse will erase all the TNMM of our cooled Universe. The observer who survives it, would witness (pure fiction) a «renaissance» of what could have been his Universe. With a lot of imagination, this would mean that he would be teleported into a «second generation» Universe, without significant link with the disappeared Universe. This presupposes unbeatable health and to does not to

annihilate into the multiverse Cosmos, two conditions that are more than difficult to meet. **But this observer would discover in theory, a return to a past that he might have been his.**

Time would be an invention necessary for understanding, but also a source of confusion. Each observer, whatever his location, takes with him a clock that is his own, is set only for him and represents his signature. Also, stating that the faster we go the shorter the time, means that time does not have the same value for each space point. In other words, time can only be "local". Time then becomes the property fundamentally intrinsic to each interaction, related to the nature and intensity of it. Time is a relative data, unevenly shared and thus excludes the idea of simultaneity. *It is the story of the hare and the turtle. The first mounted «on springs» with its long legs, seems little affected by the terrestrial attraction and plays with distances. The second seems heavy, stuck to the ground and is forced to move with a slowness that penalizes it. Both are nevertheless able to carry out, each in his own way, the same course. If they ignore each other, they will however not be able to make a reconciliation in terms of speed et* **their notion of time will be reduced to that of a distance travelled. This is how gravitational "force" calibrates time in space.**

To refocus on the human condition, one would be tempted to say, that the Universe that we dress with our gaze, will disappear at the same time as its precarious observer will disappear. Whether we accept it or not, time refers to our experience. We calibrated it against a need to understand the events we are experiencing. Thus, shorter than a fraction of a second and beyond a lifetime, time escapes us. This is the reason that explains our invented and complex relationship to time (past, present, future), correlated with the familiar notion that we have of a three-dimensional space. *To be convinced, you just have to watch a 90-minute whole film in a few seconds' time. The scenario, which takes place on a shortened time scale, is totally beyond our comprehension.* A time scale compressed to the extreme, fact that each binomial of universe/"anti-universe", as soon as created, is soon disappeared. In fact, our positioning over time does not allow us to see anything other than a limited actuality and we are trying to expand.

XXVIII <u>Hidden universe and semblance of reality</u>

(A chapter that accumulates the images)

Our cartesian logic, which incentive us to want to link everything, is not without confusion. There are plenty of examples that reveal our inability to imagine, which seems a priori inconceivable such as:

- a finite Universe without an accessible edge,
- a binary system of universe in “offset” quantum symmetries,
- space and time are interchangeable,
- a busy and turbulent vacuum of "barometric tides",
- particles in superposition of states and compared to bubbles,
- interactions assimilated to link-lines,
- an optical illusion understood as an expansion
- constants that seem to be variables in the duration
- exchanges without travel
- a matter that is physically palpable but that is fundamentally not tangible,
- a virtual multiverse Cosmos…
- timeless elementary particles
- black holes considered as quantum objects outside our space/time

An excess of complexity, added with some paradoxes, even seems to reassure us by proving that we know how to get to the bottom of things. It must be recognized that too large or too complex leads to partition, depriving us of an overall vision. Broadening our field of reflection is an exercise that quickly shows its limits. But, to simplify by ignoring certain data, we can only have a reductive effect, because on this subject, anything interfering with any other, must not to be obscured.

This leads to the question of what makes everything related. Perhaps we can explain it by taking gravity, the central phenomenon in the evolution of our Universe (as the force of attraction and acceleration of the bodies), as a support point:

How to connect time, space and gravity?

The time
For those who are more affected by gravitation or will be in constant acceleration, time passes more slowly. The subject ages less quickly. Time, by becoming more «compact», slows down its biological clock, except from its own point of view. Although his body would show its limits on this occasion.
For those who are subject to gravitation to a lesser extent, time seems to pass faster. To make any kind of trip seems to require more time, except for the person who would have good reason to complain about it.

The space
For those who are more affected by gravitation or will be in constant acceleration, the space occupied contracts. The mesh of the space occupied tightens. The subject is gaining weight (actually gathering energy), except from his own point of view. But no doubt he would not survive it for long. For those subject to gravitation to a lesser extent, space is more distended. Again, any travel seems to require more time, except always from the point of view of the person concerned who would deplore the physiological effects of that.

Any observer is placed in a context attached to him or her and serves as a reference. This makes that from the point of view of the observer that we are and from its only point of view, for any body in constant acceleration, its mass is perceived in increase and the flow of time seems slowed down. This intellection of time makes it possible to understand it as an additional dimension of space, while time makes space as space makes time.

How to connect energy, matter and gravity?

The energy is everywhere. The energy fields make the weft of space, which leaves no room for emptiness stricto-sensus.

The matter represents an unmistakable moment where space/time, by narrowing as closely as possible, takes in our eyes a tangible form that builds our reality. Energy, by becoming a mass-holder, modifies the architecture of space. This process will lead to putting back «at the same time» the pendulums of the 2 symmetries.

Gravitation: engine of the Universe

Gravitation describes the spatio-temporal deformations of energy fields more or less strongly closely-linked. We can draw a parallel with magnetism to better understand gravitation by noticing that *the quantum symmetries interact with each other a bit like do the north and south poles of an electro-magnetic magnet based on the presence of EMW whose it may be thought that they are the prime contractors of gravity* (see Chap. XVI)

When the gravitational effects are reinforced, the space is deformed as if an unknown force was trying to precipitate the energy it carries into a bottomless well, hidden in the heart of any massive body. *This is the case with a net of trawls whose mesh size on the periphery is less affected by the mass of the caught fish than the few central meshes which focus the entire product of the fishery.*

In the final form of MMBH, the gravitation «digs» thus a multitude of wells (referred sometime «wormholes» in version F.S.) supposed to join during the final collapse.

Electromagnetic waves: the motor of gravitation

Charged particles possess a magnetic movement that we attribute for the most part, to the intensity of their electric charge and the properties of their spin. These magnetic movement result from electric currents between particles of contrary charges.

But is the dipolar magnetic state that we see when we observe built matter, an intrinsic and fundamental property of the particle in interaction? Why the particle considered as a bundle of entangled waves would not hide a monopolar magnetism? This suggests that the antiparticle would have an opposite sign monopolarity. It is only from the supra-atomic scale that we would begin to observe the dipolar state of the matter, the fundamental state of a particle not allowed to be observed (see chap. X: superposition of states and chap. XXIX: decoherence).

The known electromagnetism, implies quantified electric charges (in whole multiple of the elementary charge of the electron) in displacements. This

electromagnetism, which is indissociable from a magnetic bipolarity forming lines of field (notable characteristic of magnets), seems to exclude the existence of magnetic monopolies. This latter would underlie a particular form of symmetry, chiral in a way, difficult to integrate into our standard model. A situation of very high energy in relation to a particularly high mass equivalence and/or a context of very low temperature, would be necessary so that this state does not remain out of reach of our observations. This could be the case for the black hole considering that it shows no internal electrical resistance and is devoid of significant temperature. But how to describe a magnetic field frozen out of time, by the collapse of matter into a black hole?
It could be, just as much, a discrete property of the elementary particle in the ground state (case of a particle at its lowest energy level). Some theories of great unification envisage, moreover, the possibility that under particular conditions, the magnetic poles may appear separated, realizing a magnetic monopole not generating the usual field lines. That the magnetic monopole is a typical phenomenon of elementary particles and black holes, would lead to rethinking our standard cosmological model.
This idea of magnetic monopolarity considered as intrinsic property to the particle, would support the idea that gravitation is a force of quantum origin. That is how we level out scale problems.

On the idea of wave packet representative of a particle, we could make a parallel (one more) with the musical sonorities.
For each note, let us assign a wave frequency.

A no dissonant chord would represent a wave packet, that we could then assimilate to a particle. Each note of the chord is in harmony and becomes inseparable from others.

The same would apply to the kinetic movement of the waves which, when they are entangled in the form of particles, **could be interpreted as the addition of wave vibrations forming a closed, “folded” system to its inertia.** As in a chord of notes in harmonic intervals, the perfect consonance makes forget the notes of the chord.

XXIX Decoherence and its metaphysical interpretations

(A theory that revives debate and disturbs understanding)

The function of wave consists to attribute to the particle of matter (fermions), the properties of a waves packet, playing with the duality of waves/corpuscles. This wave function is an imaginary wave, a purely mathematical construction that has nothing much in common with the interactions between electrically charged particles that make up electromagnetism. The wave function represents a probability immaterial wave. It means that the particle has no precise location or traceable displacement, like light (EMW), but can be represented by an energy field with fluctuating intensities. Interfering with other fields of the same nature thus the topology of space/time is realized. The problem, and it is a big one in quantum mechanics, is that we should do well, forget the notions of location and displacement when we can do nothing but use relativistic measurements of position and speed (the constants are the very example). At best, the wave function can be interpreted as the mathematical representation of a field of possible interactions representative of a bundle of intricate primordial waves. From this point of view, particles of matter, atoms, molecules and stellar bodies could theoretically translate as a wave function. It is to be feared, however, that for massive objects the equation formulated as follows: $i\hbar\frac{\mathrm{d}}{\mathrm{d}t}|\Psi(t)\rangle = \frac{\hat{\vec{P}}^2}{2m}|\Psi(t)\rangle + V\left(\hat{\vec{R}}, t\right)|\Psi(t)\rangle$ is devoid of practical significance. The wave function of an antiparticle of matter could be understood as modeled in symmetry of that of its partner particle.

A mathematical formulation of the wave function, called the Schrödinger equation, allows the possible evolution of a particle as a combination of potential quantum states to be represented in a nonrelativistic way. The problem lies in the fact that the particles have an unobservable superposition of possible states and that any measurement reveals only a particular state determined by the conditions of observation and the status of the observer.

The collapse of this condition of superposition of states, as soon as one leaves the quantum dimension to observe in the macroscopic world, is called quantum decoherence. Decoherence shows what is called the reduction of the wave packet. In plain language the superposition of states of a particle then disappears in favour of a determined state resulting from the interpretation of atypical traces presumed to be left by particles. These observations involving the components of the atom, require special conditions in the containment of detection chambers which in any case are not able to remedy the collapse of

the wave function. The environment is therefore decisive and all its aspects and parameters should be considered in any measure. But how could we correct our observations of the decoherence effects related to a containment device which has nothing innocuous?
The interpretation of the observed traces, based on probability algorithms and statistical data, describes a reality which may then seem in part presupposed by the observer. In this, lies the major problem of quantum physics so difficult to grasp and the difficulty of building a unified standard model.

Today's particles are the updated memory of countless phenomena shared in the past. Radiative entanglement, decoupling electromagnetic radiation, recombination, nucleosynthesis produced differentiated particles. However, particles of the same nature retain a common quantum patrimony that they continue to share a little like the living cannot get rid of a genetic patrimony. Thus, what affects a particle can affect other particles of the same nature, without consideration of time or remoteness. As surprising as it may seem, this copy-paste is a major feature of particle physics in a scale context where time and space « struggle to stand out ». Undoubtedly, the degree of quantum entanglement between two particles linked in this way, in a system, evolves, because some interactions are not necessarily shared. This could be especially the case following certain cataclysmic phenomena such as supernovae.

At the macro level, complex systems evolve all the more distinctly as they are located distant from each other. Non-separability and relativity are not opposed: everything is a matter of context (from quantum out of space/time to relativistic classical).

To put it simply
- Quantum mechanics should incorporate the hidden properties of wave packets that we can hardly approach because out of time and space. She is missing out on relativity.
- Classical relativistic physics would like to describe the evolution of the Universe from its observable content, in a spatiotemporal context that makes our reality although we do not perceive all aspects of it.

In what would be the true quantum reality, the particle is only «packet» of waves or bundle of wave packets (for composite particles). The idea that the atom is made up of particles in orbit around other particles is only there to allow us to understand through this image, a rather counterintuitive physical, touching the infinitely small. Getting out of its corpuscular image, the electron represents the negative charge counterpart of the atomic atom. However, it does not actually describe a trackable orbit around a nucleus. Once everything becomes a matter of "packets" of waves, things seem much less intelligible. Richard Feynman said so good at saying, “I think I can safely say that nobody understands quantum mechanics”. It remains to be seen whether he really thought so.

In our macroscopic reality, we are reduced to considering any particle, any object, in a reductionist state more or less chosen.
In theory, every living being represents a sum of particles likely to be translated into excessively complex wavefunction equations. Basically, we would be a system of packets of intricate waves, in close interactions. A massive body due to the density of interactions it represents, complicates in excess the wave function that could describe it. **We can see a massive object, only in complete decoherence.**
The collapse of the wave function offers us for any object observed, a certain reality unrecognized formatted in conformity with an environment specific to the observer. Our observable environment is essentially composed of macroscopic objects. But it is the observer who, acting as a prism, sees them as such after decoherence. The reason is that we are not naturally able to see and interpret differently than what our observer status allows us. In a way, we are locked in a knowledge of intuition, feelings, experiences, scientific knowledge and technical progress. Our convictions are the product of it but they only make sense through this process (decoherence). Without realizing it, we are reduced to taking a reductive look at phenomena whose profound meaning escapes us for the most part.
It is important to note that we do not alter the components or properties of the Universe by observing it, as may have been suggested. What we see and feel is real. Simply, if we discard everything we put in the form of hypothesis or considered not accessible to observation, our lived reality presents a restrictive aspect. What we are given to observe is the measure of a space-time made, in a way, at our convenience. Indeed, everything leads us to believe that this relative space-time is necessarily related to the image we have of ourselves and the way things seem to be arranged around us. We are only beginning to realize a broader reality whose perception exceeds our cognitive and mental capacities. This extended vision is outside the framework of a spatial and temporal

reference system that is unique to us and that is imposed on us every time we consider, measure, quantify, locate, analyze something.

Our status as a conscious observer and which marks an advanced stage, albeit marginal, in the evolution of the living, does not really leave us with an alternative. We are designed to observe a universe supposed to manifest primarily as matter (corpuscular vision). However, when we look at the foundations of what makes up our reality, too many inconsistencies, paradoxes and inadequacies make us aware of our narrowness of view. This realization seems to open new perspectives for humanity. But how and to what extent do we push the limits that do not allow us to introspect further, an environment that we feel reductive by the very nature of the look we have on it?

More than a consequence of the intrusive approach of the observer, the collapse of the wave function seems to have to be considered as a general and unrecognized phenomenon of permanent state transition. This process is realized all the more fully as the observed object is massive and therefore complex to decipher. Allowing for some speculation, how to describe the real world? We constantly refer to fragmented and counterfeit information. These are the ones provided by our cognitive functions and which have vocation above all, to manage our essential needs in an environment that we dress to our liking. The hardware configuration that we give to any massive body, is due to the fact that the collapse of the wave function is for us an inevitable process in our need of understanding what our cognitive functions tell us.

Perhaps, without us being aware of it, this presentiment of a Universe fundamentally dematerializable in wave functions, is rooted in the collective unconscious. This would explain a well-established belief associating a non-physical entity (soul or spirit) with a fleshly envelope devoid of sustainability. We can make simpler with this paradigm-fiction suggested here and in which the Universe has for humanity, nothing of a procreator endowed with discernment. The big flaw of cosmology, in its non-anthropogenic sense, is that it promises nothing and does not give hope. The least we can say is that it is rather distressing for the morale, the image and the future of man. We understand that it does not seduce more than that the common man.

What distinguishes man from the monkey and the monkey from the fish is the ability to memorize and think as well as increased longevity. This is what gives us this conscious ability to be able to project into a more or less distant future. But obviously, the future shows its limits and the past leaves few vestiges. A real frustration!

With Plato, Galileo, Newton, Planck, Einstein, Hawking and many others, how many theories have succeeded each other, each one making its contribution and its particular logic. All have enriched and often challenged the ideas of their predecessors. Since nothing can be considered definitive, why should it be otherwise today?
We guess a sort of intellectual resistance imposed at all times, by a minority of specialists, on ideas which are confirmed for some but are called to be invalidated for others. One of the latest is the Hawking's interesting theory dealing with the evolution of black holes. Both wrongly as rightly, Einstein would have said, that «superb mathematics (often marked by simplifications) could lead to build an abominable physics. A major reason for this is that the space/time metric cannot have a certain value because of relativity. This relativity, in a way, has a double effect because of symmetry, making any measure immediately taken, immediately invalidated.

Who can say that some of the most recent theories will not match the errors and aberrations that have nourished our history and have since been denied? Of course, the reflection developed here does not in any way claim to erect itself in truth. These transgressions can no doubt run counter to a scientific mind convinced of the pre-eminence of mathematical models and rules which have been the subject of a broad consensus, on a logic on the margins and more or less rebellious. But how many theories, initially recused, have made possible to advance knowledge. The increasingly complex and expensive tools that have allowed to validate many assumptions are beginning to reveal their limits. Furthermore, it is highly unlikely that our scientific processes and observational tools are adapted to the "expertise" of a virtual multiverse Cosmos as proposed here. So, the open question to conclude would be:
Which ideas developed here deserve to be supported and on which points should they be corrected or invalidated?

"Errare humanum est, perseverare diabolicum," the past generations used to say with derision.
Any remark, objection or controversy is welcome, in so far as it would help to nourish this reflection and to take up again ideas which, for some, may have perhaps shock the reader.

XXX Warning

(Any resemblance to reality would not be pure coincidence)

Everything starts from the idea that there would be an infinity of binary system of universe in quantum symmetry that recover, transform and restore energy regardless of location, distance and displacement.
Each of these pairs of energy in symmetry is born and disappears in the «indifference» of the multiverse Cosmos. This repulsive vision of our Universe does not seem to correspond to our reality.
The notion of infinity that we invented cannot concern the unbounded Universe we occupy. Nor should it be retained in the case of the multiverse Cosmos because it predicts a certain idea of space. The notion of eternity should not be mentioned either because it underlies the idea of duration without end, incompatible with the concept of virtual multiverse Cosmos and the assumption that our Universe had a beginning. Space and time would be exclusively and totally the resultant within our reach of a chiral, discrete quantum symmetry of matter that makes our world observable.

We forget too easily that we are nothing but a particular aggregate of molecules, in search of identity, of self-management and sustainability. This makes any living being a complex case rather marginal in an almost infinite number of possible combinations of assembly of matter. To have an asserted consciousness of existence, makes the specificity of the human being. However, the study of animal behavior proves that this peculiarity is not only the exclusive prerogative of the human race. Everything suggests that this specificity, which is common to us, to varying degrees, with the animal species, is a sum of information acquired, linked and stored in electrochemical form mainly in our brain (a network of neuronal cells with their synapse links).
We can risk a parallel with the central unit of a computer, where are recorded digital data processed by algorithms and other processing software. Our brain has this very different that the information collected is constantly enriched and interconnect faster. They are the result of experiences suffered or provoked, the vagaries of life, a more or less inquisitive look at an environment at the same time feared and conducive to satisfy an urgent need for preservation. A local environment accessible to our senses, creates automations. They make us react in a minimum period of time in the form of reflex gestures that are more and more elaborate, thoughtful and that make the difference with the animal world. This evolution in our behavior leads us to be increasingly attentive and responsive to our living environment. The major and unavoidable difference

with the machine as an artificial intelligence is that it is not, in the absence of genetic material, potentially in a process of preservation, survival and continuity of the species. Devoid of similar motivations, she is not able to interact with her leader, as we do, on an outside environment. This is a materialistic, agnostic, but rather positivist definition of self-consciousness. However, for those who want to fantasize about any form of immortality, we can understand that it is difficult to be satisfied.

Mind, soul, consciousness; what meaning can be given to these terms of the same connotation but generally distorted and confusing? To do this, we need to look at our central nervous system. Vital functions such as heart, digestive, renal, respiratory and reflex gestures constantly and probably mainly involve brain activity. But, we are not really aware of it and, whether we are awake or not, these functions are exercised autonomously, regardless of any external context of the moment. For this reason, it could be said that man used in a deliberate and thoughtful manner, only a very small part of these brain capacities. This part (the figure of 10% was advanced) would represent the remaining available fraction of our brain that allows us to become aware of our condition.

Today, thanks to a thorough knowledge of the anatomy and physiology of the body, we have every reason to think that the concept of mind or soul is a mystical interpretation of what makes our consciousness to exist. This non-physical entity can be seen as an artifice without any real basis but likely to explain some features not understood by our brain. In reality, wouldn't consciousness be in this marginal capacity of our brain to process, memorize and correlate information collected in the waking state by our senses? It is this information processed, exchanged and enriched by the use of increasingly appropriate tools that build our reality. This one, which has continued to evolve, was clearly not those of the first primates.

The consciousness of existence would be, unwillingly, only the culmination of natural selection based on the ability to manage information as effectively as possible. The brain of the whale is 7 kg and that of the elephant 5 kg while the human brain rarely exceeds 1.6 kg. The size of the organism that finds its limit by its living environment (terrestrial, aquatic or aerial), therefore, does not seem determinative. More than the capacity of the skull, it is the coefficient of encephalization which makes the difference. This coefficient corresponds to

the ability to select and connect a maximum of information, would be for the human 4 times that of the elephant or the whale. Self-consciousness would result in the state of awakening, electrochemical processes. These are potentially more powerful than those implemented in the form of binary language in software that foreshadows artificial intelligence. More available cognitive abilities, better control of its environment, compactness of mesh neural connections, optimized genetic encodings and increased longevity explain the advanced functionalities of the brain in today's man.
We have always felt the urgent need to answer certain existential questions with irrational assumptions or beliefs. Immortality of the soul, metempsychosis, creator god… have thus allowed us to give a default meaning to a consciousness of existence which nevertheless never ceases to interplay us. Let us recognize that these pious lies to which we cling, reassure us by raising the hope of a future that would continue after our death. Is it not, unconsciously, a transfer that could be translated into a quantum mode, such as the projection of a wave state (our physical appearance becomes representative of a series of wave functions), of a human body, we can no more tangible be? The photon, carrier of quantum energy is there to remind us.

In his decisive role as an observer a person with a critical eye, the human tends to perceive himself as the recognition of the Universe. It seems that it is only the product without great future, of a certain fragile and unstable situation. All evidence shows that the conditions conducive to life, even if they do not seem exceptional on the scale of the observable Universe, are not only particularly difficult to meet, but remain extremely precarious.
Our senses and observation tools remain formatted to meet our basic needs and reveal only what these inspire us to look at. We then understand that we cannot have a vision other than anthropocentric of what we are by. In spite of this, aware of the disproportionate task, who would not aspire to go beyond a deceptive reality?

Many scientific results are based primarily on direct and instrumental observation before being, for some, validated by experimentation. We thus record events from a very distant past, polluted, for the majority of them, by the effects of gravitational lens, the encounters and without real relation to what may be the present of this distant past. A mirage that takes on the reality!
This reflection, inspired by a reality that is banally close and yet elusive in its profound dimension, can only call for controversy.

Do theories such as those of multiple worlds, parallel, alternative realities or «wormholes» authorized by the deformation of space and which would allow to travel out of time or parallel worlds have more bases? Although, black holes may allow, in a certain way, the transfer of energy to other binary systems of universes in quantum symmetry (this is the postulate used here).

Space and time seem fade on the minimalist and non-relativistic scale of elementary particles as on the maximalist and equally nonrelativistic scale of black holes. At these two extremes, everything that happens internally seems hidden from our eyes and frozen. On the other hand, the exchanges which, between these two scales of magnitude, represent the evolution of our Universe, can hardly be described otherwise than by reference to time and space. To consider, as we have just done, any form of energy from the only wave point of view, is found in the idea of collapse of the wave function and gives meaning to the theory of strings. According to this theory far from being validated, everything could be described as strings in vibration, interfering between them. The very complex theory of super strings uses mathematical subtleties that make it excessively probabilistic. Intellectually difficult to access, string theory is also the subject of discussed versions (open or closed strings, branes of different types, number of dimensions to be considered …). Let us take 3 spatial dimensions of Universe multiplied by 3 spatial dimensions of anti-matter (to describe the combined gravitational effects) + 1 shared time dimension (or 2 temporalities in one) and we get the 10 or 11 dimensions of string theory. Such a calculation which extrapolates more than broadly, is obviously only a mathematical artifice without real relevance. The theory of the strings, by granting themselves a few liberties, does not lack attraction.

Any demonstration is based on confirmed circumscribed observations and mathematically verified data. By relying on a proven logic, what results then becomes by principle, hardly questionable. But far from being exhaustive, are we so sure? Too much remains to be understood or remains in the state of hypothesis!
The path adopted in this reflection, conceived more as a collection of ideas, is not exactly in line with this principle. But observations prove to be limited, mathematical and technical means do not always seem adapted, neurons are limited and logic sometimes loses often its Latin.
These considerations, which are somewhat speculative for some, do not complete this **theory of a "All from Nothing… other than virtual» and in which, smaller than the particle and larger than the Universe, everything**

becomes virtual. Our Universe fiction lies between these two extremes. But is this notion of virtual that has no physical representation for us within our reach? This concept has the merit of giving a possible light on the why of physical phenomena that we are unable to link coherently to a primary cause. Let us agree that our status as a creature with a relatively developed intellect does not give us access however to this type of investigation. Of course, this idea of virtual can also be considered as an artifice, pure product of the imagination.
It is a rather frustrating way to end, without really concluding, this discourse on the foundations of the Universe.
Everyone is free to confront this freedom to think of his own views of the mind, in the absence of deep convictions, which often give rise to suspicion because of a lack of objectivity.

How many assumptions have already been considered to try to explain such a difficult environment? Without responding in a totally satisfactory manner, this reflection shows its differences. It remains, however, consistent with most of the scientific achievements and seems to be able to face up to our reality. But who can claim to have a truth for all, on a subject whose depth gives vertigo?

Science and its many applications provide many points of reference for our way of thinking, if only in terminology and databases. Without rivalry, the imagination has always been able to bring some decisive suggestions or innovative ideas to the research.
Knowledge in this field touches more and more on the abstract and sometimes rubs shoulders with the irrational. It is moving further and further away from our capacity to understand and concerns only a small and relatively inaccessible circle of specialists. Even for these, a global and definitive answer on the nature of the Universe seems far from being approached. One readily imagines the astrophysicist, like a passionate prospector, exploring unknown lands and painstakingly revising his plans and taken up as the difficulties encountered. Difficult not to have the head in the handlebars while the road remains to trace! Perhaps this is why many famous and deserving physicists were able to make some fixations on achievements and reject, at first, dissenting theories that questioned their previous advances.

The discoveries in astrophysics and cosmology have often been the subject of epic and sometimes virulent exchanges between scientists, remarkable though they are, each one remaining on its position in a kind of trench war. Would have that been the same if these ones had produced anonymously, put less certainty

in their ideas and showed more openness to theories that for some, turned out to be better answers to certain questions? In this area, history reminds us that what seems to be established and "proven" is not immune to questioning. The reflection developed in these lines, which has nothing irreverent, has been in this state of mind. Proposing and submitting does not exclude having one's own convictions, which are not set in stone. Mistakes are like dead ends; they usually lead back to the right path. The mistake would be not to accept mistakes.
All indications are that the next great discoveries will refer to a physic of another «nature». New ways of thinking are likely to mark humanity in the future by stripping it, hopefully, of a profusion of pre-established ideas. The history of cosmology is a prime example.

The imaginary, while respecting as far as possible a so-called pragmatic logic, can, without abandoning itself totally to fiction, free itself from many codes. Einstein, Dirac, Heisenberg, Bohr, Wheeler did not lack imagination, quite the contrary. Without this quality, which led them to think outside the box, the use of mathematics would not have been of great support to them. Some of these physicists, who were primarily visionaries and worked in collaboration with mathematicians, are said to have had no exceptional knowledge in this discipline. Their merit, too, is to have relied on existing theories whether they are proven or denied afterwards. However, there are limits to everything. Thus Einstein, with overflowing inventiveness, could not imagine the «expansionist rendering» of our Universe and rejected the existence of black holes. It is in human nature to refuse to question convictions that are sometimes hard won and coloured with truth. And above all, to be contradictory, is to agree that we were wrong and thus to undermine its credibility.
The Copenhagen interpretation shows our powerlessness to describe the quantum phenomena we pollute, in spite of ourselves, by our observation techniques and that the level of scale makes inaccessible to us. Max Born, one of the fathers of quantum physics, was perhaps not wrong when he said that theoretical physics had, in many aspects, a penchant for philosophy. Our consciousness is whimsical and cannot be exonerated from concepts and hypotheses in exercises of thought often speculative. We understand that philosophy claims privilege of asking questions to which science should seek answers.
The temptation is great, however, to go astray on the path of philosophy, when it is limited as is often the case, to a form of meditative thought, detached from real realities.

XXXI Where it's about Nothing

(A virtual nothing that leads to everything)

The physics which is at the basis of our standard cosmological model has been developed in a "context" that is familiar to us, though imperfectly explored: that of remains of a past open to observation and a present of proximity who remains to understand. Nothing says that the rules we have built from that, are demonstrated and immutable. Although we lack hindsight, the physical laws that govern the precarious balance of matter should logically evolve as our Universe evolves. Thereby, predicting future changes suppose a certain margin of uncertainty or more exactly unpredictability in the predictions.

The commonly accepted logic consists in wanting to explain the Universe on the basis of equations and mathematical formulations detached from any personal involvement and subjectivity. This approach, which has proved its worth, is unquestionably founded, although limited by our conception of science as a tool of exploration and interpretation. Mathematics, physics, chemistry, biology are at the measure of our thought form. Applied to astrophysics, these tools that man has patiently elaborated, give meaning to what we struggle to understand from our reality, but is that enough to get to the bottom of things?

We would like to make science a charter made up of rules that are repeatedly verified and considered irrefutable. Without thought exercises, without imagination, without questions of a metaphysical nature, what science would be. But, without modern mathematics, an essential tool of scientific development, it would have had a limited development. This agreed language of development and prediction based on numbers, signs and symbols, gives us the means to reason and interpret in terms of quantity, value, relativity or causally. Could we without this artifice of thought give a profound meaning to what our senses reveal to us? On the other hand, this codified and abstract formalism moves us further and further away from an empirical vision from which we cannot detach ourselves from body and instinct. Indeed, we are destined to interpret everything in relation to our condition as living organisms closely conditioned by feelings of satisfaction, of frustration and of preservation. Our thought exercises have great difficulty in approaching an unknown reality, totally counter-intuitive. The more we try to blow up this screed which encloses us in a mirage of forms of reality, the more we accumulate paradoxes and abstractions.

Why does the Universe that we introspect show so many facets that seem to be out of tune with our reality? **We are tempted to wonder if our Universe would not be itself in superposition of states. This idea of a Universe that can only then be decohered, sums up our difficulty in distinguishing the true from the false when we seek answers to what makes us what we are. Who knows if we should not go further and open ourselves more to the imaginary? Due to lack of inventiveness, we have a natural tendency to look above all for evidence.**

The idea of multiverse Cosmos is similar in some respects to that of multiple worlds but deprives it of the duplication aspect of alternative worlds advocated by H. Everett. This theory of multiple worlds implies that unconsciously, we would make choices that would make us evolve from one world to another in a succession of logical states. Would it not push the idea of decoherence a little further?

Are we using the appropriate logic? The one that would allow us to think outside the box, would it not be outside the major lines of research developed by technicians trained in excellence? Spectacular as they are, our decisive achievements have been achieved for the most part over the last 10 decades. This perception of an unsuspected world is too recent to conceal the extent of our ignorance and our embarrassment to connect between them phenomena difficult to explain.
For some, and this often more out of convenience than conviction, the truth can be only ultimately spiritual or divine. This simplistic and infantilizing view of our world dates back to the earliest days of humanity. Since then, man has evolved and his critical sense, long muzzled, has developed. For those who do not reject the real substantive questions, the Universe would make sense only for the observer who is its product and paradoxically questions the root cause, the reason for being and the destiny of this Universe so little intelligible to him? This is the thesis here.

If we get out of our most successful thought patterns, could not the answer lie in what we call the virtual? This point of view necessarily disturbs because the vision we have of our Universe exists only by the gaze of its observer. The latter can only be convinced of the reality that is imposed on him and in which he fits in completely.

So, what sense can we give more precisely to this fundamentally abstract concept of Virtuality?
What is virtual cannot have a tangible representation, likely to refer to our reality. Thus, the elementary particles are basically virtual because they are assumed to represent quantum fluctuations of fields not directly observable. It is difficult to distinguish precisely the virtual from the real. The simplest is to consider that our real emerges from the virtual and gradually draws itself as the energy takes shape and lets itself be observed by scaling. E= mc2 has true reality for us only left out of elementary particles.
Everything comes from the fact that our reality is entirely driven by the rather limited perception that our senses give us and a vision that is unique to us of a local environment from which we cannot physiologically detach ourselves.

When we dream or watch a film, our mind projects us into a world of fiction and our body often reacts by changing its emotional behaviour. The virtual then replaces a normality built around our lived. However, in astrophysics we are in the opposite situation. In the state of awakening, our lived reality is perceived through our history and conditioned by our senses while the true reality is to be found in the foundation, the unrecognized (and therefore virtual for us) nature of our Universe.

Like the idea of relativity (imagined, formatted by A. Einstein and initially rejected by the scientists of the time), the notion of virtual then becomes a key idea. It invites us to detach ourselves, by thought, from the too obvious realities of our good old planet, with the help of images or concrete case like for example to illustrate the relativity:
That of a traveler placed in a plane flying at 1230 km/h and who would throw a ball forward. the impetus given to this ball would be only about 20 km/h and therefore for the passenger, far from exceeding the speed of sound which is 1235 km/h. The plane is its reference point. Moreover, the ball does not emit the bang that it would produce in an open atmosphere.
However, for a stationary observer on the ground, the speed of movement of this same ball would be 1230 +20 or 1250 km/h; higher than the speed of sound. Thus, for this latter whose repository is given by a fixed point of our planet, the ball has travelled more distance in the same time or formulated otherwise, took less time to travel on an equal distance.
Similarly, an observer without any movement (theoretical hypothesis) in our galaxy, would find, in the case of the same event, a bigger lengthening of

distances and a bigger shortening of time. Because in this case, the displacement of the earth must be considered. The repository is on the scale of the galaxy as a whole.
That would be just as much, of an observer outside our galaxy which should consider the movements of displacement and rotation of it within the galactic cluster of which it is a part.
Impossible to imagine an observer outside our Universe, because how to describe something from a Cosmos without a space dimension in a time without duration?

In summary, a repository could be defined as the sum of the effects of synergy and gravitation specific to an observation point.
Each observer therefore has its own repository which is unique but is nevertheless be almost the same for all on earth, because of close proximity. In opposite, it will be different for a space traveller who perceives distances and time differently.
What may seem paradoxical is that the speed of motion of the photons (299,792,458 m/s) will be perceived as identical by any observer regardless of its repository. Indeed, distance (m) and time (s) vary together and the displacement/time ratio at this speed considered impassable, therefore remains similar for all, at the same time imagined universal T. This shared T-moment remains difficult to conceive, however, because of the lack of common shared repository that excludes any idea of simultaneity but also of universal chronology in the order of events.

The evolution of the Universe makes that the speed of light can, in the future, only tend towards a non-significant value. Indeed, as envisaged here, the condition for the final collapse is the absence of motion and radiation after that the energy fields have been absorbed by the MMBH.
One would be tempted to think that what we call «the void» should follow the disappearance of our Universe. It is to forget that true emptiness exists neither in the Universe (where energy without mass is unduly associated with emptiness) nor in the multiverse Cosmos (where energy is presumed unrevealed).

Antiparticles make stealthy appearances in our Universe. On this occasion, the particles, confronting their symmetries, disappear from the landscape but the energy they carried is preserved in another form. Feynman had put forward the idea that the antiparticle went back in time in the opposite direction of the sister

particle. Indeed, by annihilating itself with its symmetry, the energy it represented returns to its state before the radiation entanglement phase or before the interaction that created the particle/antiparticle pair.
To continue on this idea, let us leave (difficultly) the Cartesian or Newtonian mode and approach the problem in virtual mode, in other words from "Nothing" …, or rather, from nothing understood here as a virtual conjecture symptomatic of latent energy and representative of a potentiality of unpredetermined states. This virtual can still be defined as a multitude of unforeseeable realities.

Heir to our history, our logic is formatted by and for observation. It purports to explain any event by a causal context of circumstances. And it must be noted that everything understood is always based on "something else" that we have previously understood and accepted, except to want to go back as we do here, to the origin of everything.

How to get out of this logic that perfectly adapts to our reality?
Unthinkable as it may seem, why not want to explain our Universe from Nothing, or more precisely « nothing else than virtual energy». Because, the logic of relying on something pre-established ultimately leads us to want to understand everything from a primary cause which, in any case, will remain inexplicable.
How to be more explicit on this notion of virtual Nothing?
The Nothing, we are talking about here, represents energy in the absence of time and space and refers to the idea of a multiverse cosmos all virtual.

On this idea of « Nothing but only virtual », let us make a brief reference to mathematics:
If we start from 0, in other words from nothing, and cumulate in positive and negative all possible or imaginable numbers (admissible hypothesis in arithmetic), the final theoretical result would theoretically be equal to 0.
On the other hand, this operation, which presupposes an interminable process, can have different meanings at all stages of calculation:

- *whether you start or end with a positive or negative data*
- *according to the alternation of positive and negative numbers*
- *according to the completely random choice of numbers and their arithmetic meaning*

The result, <u>at any stage of the current calculation</u>, will be only exceptionally equal to 0.

It is the process of the calculations and therefore the time of the "events" (this succession of operations) that creates this illusion of non-zero result. If we remove the time factor, the result of this endless addition can only be equal to zero.

Classical physics finds its extension in quantum physics. If the latter describes satisfactorily, the interactions in a Universe of particles, it suggests a quantum beyond that hides a fundamentally dematerialized physics, based on the idea of quantum symmetry and wave packets. This hidden physics escapes by its very nature from observation. It describes interactions where distances do not exist, in a context where the idea of infinitely small joins that of infinitely large. Time is abrogated; beginning and end are confounded, causes and effects are no longer distinguishable.

From this, it emerges that we should give up wanting to put everything into equation in our quest of a theory that we would like to see as global.

The difficulty lies in the fact that our form of thought is not capable of conceiving and describing, in appropriate terms, a unified theory for a Universe that turns out to be so different from the observable reality that we have built ourselves.

Cosmological Equilibrium could be described as an immutably stable, virtual, “latent state,” but also as a continuum of universe binary systems in quantum symmetry. Faced with our reality, such a concept defies logic. We are in the most disconcerting abstract.

In the end, for those who refuse to associate this uncomfortable idea of « **All in Nothing that is only virtual** » with the concept of Cosmos multiverse, the question of the foundations of our Universe, remains open.
Curiously, speaking as we have just done, of the absence of space and time, far from evading the questions, proposes built-in solutions. Of course, this does not provide a fully satisfactory answer to the observer who has some difficulty in conceiving that it would, in the end, come from a virtual «Nothing».

A living organism, endowed with the capacity to think, would not in some way be the culmination of all this? This is not lacking in pretensions and joins this deep conviction for Man to have his place at the center of «everything».

It would be forgetting that, no more than our galaxy, and no more than our planet (observation point, privileged by force of things), we cannot be considered as the center or starting point of anything.
If we want to remain a little pragmatic, it becomes better not to speculate too much on this fantasy of anthropogenic Universe and to approach things from a less closed angle. However, we will come back to this in the epilogue.

XXXII How to complete this reflection?

(With a physics of a 3rd type, which cannot be more discreet)

How can we unify and reconcile what we consider to be confirmed achievements but without clear links, in our understanding of the Universe? A certain unfinished but globally consensus modelling has been built through a two-pronged physics:

- Classical physics, which is that of general and restricted relativity, is deterministic and is based on the gravitation of bodies in relation to time and space.
- Quantum physics that does not reject special relativity and is particle physics is considered too 'random' to take gravity into account. Space and time have no certain value. By assigning a uniform rectilinear motion to any object, it does not consider gravitational effects as does general relativity.

Quantum physics is thus led to ignore any spatiotemporal context and to relate on the one hand to the idea of superposition of possible states of particles and on the other hand to that of a necessary duality wave/corpuscle. In short, matter in its most fundamental entrenchments, seems to ignore time and space. This means that gravitational effects are not discernible on this order of magnitude.

All this suggests that we have probably not sufficiently expanded our scope of thinking. So, nothing really surprising that we cannot explain among others, mass and energy insufficiencies.

The black hole is a quantum singularity outside space-time that excludes itself as such, from our classical physics. However, a black hole remains because of its gravitational effects, an observable phenomenon that can be integrated into general relativity. From this double point of view, gravitation therefore also becomes a property of quantum mechanics. Our embarrassment comes from the fact that the horizon of a black hole does not let anything pierce from what is happening in the heart of it. However, we know that this screen is not an impassable border. The black hole is thus totally in this 2-pronged physics and marks the border with the multiverse Cosmos.
The gravitation that will lead to deconstruct the Universe seems to be present on any scale, even if the equations that define it in general relativity may lose their meaning in particle physics. Related to the discrete interactions of an undisclosed physics, imagined at the root of what makes energy in rupture of

symmetry, these equations even become totally irrelevant. The gap between our reality and what our most recent advances suggest is widening further. We are reduced to doubt, to question, and ultimately to try to conceive of what seemed unthinkable until now.
Building a global model from the sub-models of classical relativistic physics and quantum mechanics, invites us to imagine a context that we would have neglected until then and that would make them connect. One comes to think that there is a missing link or a necessary step to arrive at an archetype of physics representative of an expanded standard model. It could be, in a way, an interactive and virtual «base» devoid of a spatio-temporal dimension, underlying what we know of physical laws but determining them.

The answer would be discreet symmetry; it would explain all the oddities and paradoxes that taint the «enlightened side» of our Universe.
The concept of a binary system of universes in quantum symmetry leads us to imagine processes of discrete exchanges and interactions between two symmetrical states sort of "superimposed" or interacting in "parallel dimensions."

What makes this arbitration between these two symmetries and which we could call <u>fundamental</u> physics, would have nothing mechanical. This unrecognized physics would neglect the location and time of events.

- **In classical relativistic physics**, an object (vehicle in motion for example) allows a traceability, in accordance with the vision of the observer. Speed and position can be put into equations. **This classical physics describes in observation mode whether direct or indirect.**

- **In quantum mechanics**, the elementary particles, wave packages that constitute matter particles and are observable by their incident effects in classical physics, do not have a certain position or speed of movement. **This physics analyses in deduction mode, in close coherence with relativist classical physics.**

- **In fundamental physics, (presented here as a 3rd type physics), <u>everything becomes informal.</u>** There is no longer an object as a representation of matter but only discrete, unrecognized interactions between quantum symmetries. These phenomena are not perceptible to the observer that we are. All interactions attributed to particles that we have great difficulty to describe through quantum physics, free themselves in fundamental physics from the laws on which we base our reality, to open on the Cosmos multiverse. **This so-called fundamental underlying physics, based on the concept of quantum symmetry and which would suggest the foundations of the Universe, nevertheless allows us to build in this reflection links that explain and bring together classical and quantum physics.**

The major problem raised by this 3-part physics, is that quantum mechanics seems to be on the margin of space/time, this theoretical, not physical concept, associating a three-dimensional geometric space with a temporal continuum. It seems, in fact, to stand out from the general relativity on which a so-called classical physics is based, which describes the interactions of matter and its effects on space/time. Curiously, quantum mechanics leads us to ignore the passage of time in the interactions between elementary particles as movements that they would be supposed to have in the three-dimensional space that makes our observable environment.

Deprived of any reference, and faced with an absence of proven physical laws, we find ourselves devoid of our usual logical references with a causality principle who would be forgotten and a relativistic theory of gravitation that becomes irrelevant.

This explains our confusion when we mention the concepts of non-locality, superposition of states or dimension (this term is not really appropriate) specific to antimatter. Of these hidden phenomena, we are unable to make a mathematical transcription and can only stick to a statistical interpretation not significant, arising from calculations of probabilities. Despite this, we would like to give these totally counterintuitive concepts a spatio-temporal framework. This disconcerting exercise in the abstract, testifies to the limits of our understanding of a Universe that seems to exceed our sense of understanding when we change scales to speculate on the unobservable. The third part, which deals with the discrete interactions between symmetries and would like to give a coherent overview of everything that affects our Universe, is a logic of the abstract that cannot claim to be the bearer of apodictic truth.

These 3 levels of physics; classical, quantum and fundamental, tell the story of our Universe. Such a triptych would be a global response relatively coherent, representative of this much coveted unified theory, of an All in “Nothing but

Virtual”. The laws that govern each of these three scales of physics, remain fundamentally linked and interdependent, as the pieces of a puzzle, although the nature of the phenomena they describe, makes think that they are specific to each of them. Changes in contextuality and scale are not foreign.

Galileo’s realistic physics, Newton’s pragmatic physics, Einstein’s space/time physics, Planck’s quantum mechanical …, the path is laid out that invites us to go beyond our particle physics. So, there would be a missing component to astrophysics, which would explain our Universe from its most remote foundations. We are not talking about a spiritual entity, but about an «ignored stage», necessary for our understanding and which would represent the « boundary zone » between the multiverse Cosmos and what we attach to the quantum world.
This additional fundamental mechanism does not seem really open to intellectual investigative tools such as our most advanced. The advanced ideas of non-locality, quantum entanglement, quantum decoherence as of superimposition of states well reflect our embarrassment to conceive a Universe deprived of temporality and displacement in its last entrenchments (those of the infinitely small) as to predict a multiverse Cosmos of virtual nature.

A break in the cosmological balance (Big-bang) would be the cause of a metastable symmetry between particles and antiparticles. In any case, the revealed side (that of matter) to which we are attached, does not give us access to such a fundamental symmetry dynamic involving particles/antiparticles. These discrete, underlying interactions between quantum symmetries and justified by opposite quantum numbers and charge would be decisive in all phenomena affecting matter. But, this matter of which we are made and which manifests itself to us on the scale of the observable, makes in some way screen. This is the idea adopted here and which would give more coherence and a new readability to a cosmological model that has become problematic in many aspects.

Gravitation is the physical phenomenon that we feel in the first place. Moreover, it affects all our behaviours. Remarkable on the macroscopic scale, it would find its deployment in quantum mechanics under the effect of electromagnetic force and would hide its origin in this so-called fundamental physics that represents the trade-offs between quantum symmetries. A virtual context made of «Nothing that seems to belong to our reality» is what comes closest by default to this "physics" by nature, beyond our reach.

A long time ago, an Indian mathematician had suggested that the result of a finite number divided by zero, makes sense only if one substitutes for the idea of nothing, that of infinitely small. So, for example: the number 5 divided by an infinitely small, imagined number, would give an infinitely large but real value. Otherwise, without this extrapolation of the digit 0, the result of this division by nothing can be defined and remains unverifiable. Note that even by substituting for 0 an infinitely small value, no result multiplied by this almost 0 is equal to 5. This means that the number 0 only makes sense associated with an infinite value, contravening the idea of nothing as a total absence of anything. We can deduct from this that an infinitely small number is without remarkable spatial dimension. As such, could it not then represent the fundamental unit almost indivisible and non-convertible that would be valid in all repositories and that would render the transformations by change of coordinate system obsolete (Lorentz transformations). That is kind of where we are headed with Planck's formula, this unit, which tends towards 0 and makes it possible to quantify the energy considering the undulating aspect of it. By pixelating the energy into insignificant fragments of space would theoretically mean dressing it with mathematically elusive values.

Paradoxically, starting from «something» imagined infinitely large or infinitely small, how to extract or produce anything of definite value except to distort the notion of infinity?
The notion of infinitely small as well as infinitely large would therefore tend to be superimposed on that of absence of all things. These «things» that make our physical reality, however, seem to want to inflict strange prohibitions to us.
This parenthesis on zero and infinity, two antinomic values, leads to a rapprochement with the concept of multiverse Cosmos without limit, indivisible and timeless. Let infinity merge with zero ($\infty \approx 0$), would validate the virtual nature of a multiverse cosmos that has nothing physical.

This idea of «Nothing» is clearly distinguished from that of nothingness which could be understood as the absence of energy potentially breaking symmetry. But, if we define the multiverse Cosmos as a form of latent energy in the virtual state, we cannot therefore report nothing in the literal sense of the word, in this discourse on the Universe. The idea of nothingness is totally a collective imagination.

This reflection proposes a rather coherent overall theory that would explain paradoxes, would rally differences, smooth out scale difficulties and give a constructed meaning to our observations. Given the growing difficulties that hinder the development of astrophysics, we are far from having the means to validate a theory of the Whole, whatever it may be.
Rich in advances, the recent period we have known, suggests a new era of research thought more in terms of probabilities and less in terms of certainties.

XXXIII Challenge Analysis

(But not necessarily objective)

Constructive points :

- Abandonment of the postulate of a creation out of nothingness (the starting point of this reflection)
- Aesthetics of a paradigm based on an upset balance of quantum symmetries and a form of unification of mismatched theories.
- Justification of energy/matter interactions.
- Concepts of infinity and eternity redefined.
- Rather «coherent» model of the evolution and creation of our Universe.
- Place of man, as of the rest, detached from any divine intervention.
- References to a lot of accepted physical assumptions or data.
- The Big Bang is no longer the unexplained central point of a mysterious container.
- Relative concordance of the 3 fundamental forces related to the gauge interactions in a theory of the «All in nothing other than virtual».
- Gravitation is no longer a dissociated «force» from the others.
- Adequacy of quantum mechanics and general relativity.
- Retrograde dispersion and expansion of the Universe are no longer confusing.
- A Universe with a constant «energy load» in a space in depression falsely called vacuum, is easier to conceive than a Universe in expansion, coming out of a supposed «point» of energy without precedence.
- The notion of superposition of possible states makes any particle a fundamentally and originally identical cloned model and of which each "copy" shares potentially «instantaneous» all or part of the same information.
- Particles that are considered to be entangled waves packets, out time: this gives grain to grind and gives hope for new advances.
- Black holes represent the final stage in the evolution of our Universe.

Points to be taken up or insufficiently developed (and comments):

- Broken symmetry in a cosmological Equilibrium (the notion of symmetry of particles is however not new)
- A multiverse Cosmos may at first glance seem difficult to imagine, even inconceivable for those who refuse to broaden their field of reflection

- A discourse that may appear, in some places, somewhat hermetic or negationist (these points are certainly to be deepened or reformulated)
- Knowingly limited references to mathematical data (this discipline, which opens doors, also shows its limits and is difficult in a context of chiral symmetry)
- Number of unproven assertions (but is everything demonstrable?)
- Universe non-expansionist, all curves, not bounded, with gravitational effects without a marked limit (the notion of infinity can be left out)
- Frequent use of the conditional (one cannot be too careful on a subject that remains simply touched on, despite the most recent advances and many attractive theories)
- Use of shortcuts and metaphors to address the particle physics and the astrophysics (knowledge of these tools to be developed, but also for the sake of simplicity!)

Considerations on form:

The overall plan of this discourse may seem lacking in construction. It is, around a central theme, mainly a compilation of questions and ideas enriched, corrected and added over an unfinished reflection of 5 years. Have you noticed how often what we say, think, do, leave us feeling unfinished?

This explains some lengths, redundancies and image returns. Many reformulations reveal a real difficulty to develop in simple terms, certain ideas or concepts that can baffle in the first approach. No doubt, it would have seemed more authentic to use expressions such as Riemann tensor, vector of Killing, Noetherian symmetry, Hamiltonian constraint, Fourier series, Bayesian regression, anti Sitter space, operator of Laplace-Beltrami, Majorana equation, Weyl structure, hermitic space, Bott periodicity, Maslow index, Abelian variety…, a scientific jargon that has fully its purpose but does not facilitate communication.

It should be recalled that a theory can only be validated if it is proven experimentally or scientifically. On the other hand, a theory is really refutable only if the demonstration that it is erroneous, is brought. Between the two, one can only doubt, while hoping that the uncertainty is lifted and the reflection ratified or invalidated.

Epilogue

(Or statement of unfinished business)

Can we venture to make predictions about the destiny of the human species? Some hypotheses do not bode well. It is enough to extrapolate from his past. An experiment with live animals in an organized society, in this case rats, seems to confirm what many sense nowadays. The experiment consisted of placing eight mice in a box with an open ceiling, offering plenty of space and protected from any predator. Food and water were provided at will. A year and a half after the beginning of the experiment, the population is 2200 rats and newborns survive with difficulty. The experiment will end only 5 years later. A majority of aggressive males spent its time feeding and killing each other while groups of females less and less willing to breed, remained away, marking the end of this declining society.

This renewed experience with the same destructive effects, tends to show that for an average individual caught in a society in excess, immediate and essential needs must be met as a priority, to the detriment, if necessary, of the interest of the group. This choice will be made all the more priority as the individual cannot stand out from a large group that ends up oppressing him. Denial, indifference, withdrawal into oneself, exacerbated competitiveness resulting in more aggressiveness, seem to assert themselves more in a population with high density where particular interest will take precedence over the collective interest. Groups sharing affinities, are showing growing difficulties in standing out. It all comes down to a question of sharing ideology and allocating resources. An overpopulated society that is poorly managed seems to develop an individualism which is difficult to reconcile with any form of democracy. It can only compromise social peace.

The human species seems to register into this category. The consequences of an unacceptable overcrowding are known but we are probably not fully aware of them: plunder of natural resources, pollution, social discrimination and segregation, race for weapons of mass destruction, conflicts of occupation or power. A characteristic distinguishes however, the human species from these rodent mammals: an ability to consider the harmful consequences of such an uncontrolled evolution and the threat posed by certain misguided technologies such as weapons of mass destruction. We would like this awareness to make a difference!

No one needs to be a diviner to understand that deleterious overpopulation ends up generating irreversible effects. In an atmosphere overheated by the greenhouse effect, the sharing of insufficient wealth risks becoming a vital issue, to the point of multiplying conflicts, destructions and pollution. If there is a point of no return, we may well be shortly about to cross it. It seems that for every generation, the future ends with it. It is in human nature. "After me the flood" reflects fairly well a generalized behaviour in a world now governed by the finance and competition.

If our future is largely based on more or less collective choices, it is difficult to state perfect consensus. Choices are most often made in a hurry, when they are not imposed. Major decisions are rarely intended to prevent or anticipate. There are several reasons for this:

1. All indications are that we are far from mastering the problems associated with rampant overpopulation and the resulting scarcity of accessible natural resources. Fossil fuels are running out, but we will not be fully aware of them until really, they begin to fail, widening the gap between developed and developing countries.
2. An overconsumption of natural resources beyond renewable energy and the resulting pollution has the effect of profoundly changing climate phenomena. In some parts of the world, the conditions conducive to life are already altered.
3. We are looking for, and that is our primary concern, ease into security. This pragmatic quest for a well-being that is far from being shared is our idea of happiness. Why should we feel concerned about what will happen after us or for the most altruistic after the generation that we leave behind us?

How many say that nothing will stop the earth from spinning. How many thinks that exponential curves tending towards a point of non-return are only theoretical models. It is not in our nature to project ourselves beyond a future at the end of which nothing concerns us anymore. Under these conditions, can we appeal to the freedom of responsibility of everyone?
Let us assume, however, that we reach as broad a consensus as possible on considering this uncontrolled growth. It is to be feared that the measures capable of breaking down this destructive dynamic will be poorly accepted by a majority of us. Therefore, it is not unreasonable to think that coercive measures will be necessary. Our future will then be that of a controlled freedom in other words, a regulated democracy that rallies the whole human race. Does

humanity really have other choices? The conditions being far from being met, we unfortunately put our heads in the sand too often.

More than 8 billion people on earth today. Of all this population marked by a predatory growth for the planet, only one holds more particularly, not to say exclusively, our interest: our ego.

This conviction of being unique, leads us to place ourselves preferably at the center of everything. We are all, at a time, spectators and actors, but everyone would like to be the only player and referee in this role play. That is why each of us, in our innermost being, can say:
"The Universe is present only because I conceive of it and I conceive of it because I exist in the short span of time that meets the conditions necessary for life.
This leads me to think that probably nothing exists really without me that represents this consciousness of a world that I have forged for myself. On the other hand, I cannot help but consider that I am an integral part of this Universe that makes my reality». "So, I would be going to come from something I designed..." Look for the flaw!

Let us now develop this idea without restriction of scale. Let us consider the multiverse Cosmos as an infinity of Universes, in an infinity of «dimensions», without limiting ourselves to the present moment. How many universes have evolved like ours to produce an intelligent life form and how many have aborted? Since nothing connects the numberless Universes that give meaning to the concept of multiverse Cosmos, the question cannot be answered.
And in our universe, how many planets like ours, what we call exoplanets, have been able, can or will be able to develop life at a stage at least as advanced as the one we know?

A near-infinite number of possibilities becomes in terms of probabilities, a near certainty. La life should statistically be present, in number, on other exoplanets, as at other past and future moments!
In that case, can it be envisaged **that what I am...** may exist or have existed without memory of any past, in that same Universe or any other binary system of universe in quantum symmetry and at any other moment. The physical appearance of another life form does not matter. Formulated otherwise, why should we not be duplicated infinitely, without possibility of sharing these same answers.

We could compare this script to a puzzle in 3 D, fragmented to the extreme. Each thinking piece would represent a player who would play alone in his corner, ignoring the position of others and the progress of the game.
Since all communication is forbidden due to remoteness and temporal lag, what would be the raison d'être of this «universally» fragmented consciousness? The answer is in the multiverse Cosmos.

Thus ends a very singular draft of what could be the history of our Universe. It gives the reply to all these beliefs that abuse us by pretending to satisfy our ignorance. Religion is a compilation of pseudo certainties about things that cannot be seen and considered inaccessible to any scientific approach. Science proposes a pragmatic, open-ended model, based mainly on justified, recurrent and related observations, but also on realistic hypotheses as well as on concepts taken as a working basis. Whether you are gullible or critical, curious or contemplative, realistic or dreamy, manipulative or pragmatic, you will adhere to one or the other. These few lines answer also to those who are led to think the Cosmology in a logic that would explain the reason for our Universe by our presence. Clearly, this anthropogenic principle poses the problem upside down and is a fantasy as old as the world.

Of course, it is not forbidden to think that everything that has just been developed is akin to a form of philosophical therapy.
But who knows!

Contact and feedbacks: dominique.chardri@hotmail.com
Thank you for your comments and suggestions

The final word

(For an endless story!)

Without end, because this reflection has not ceased to be taken up, amended, supplemented through readings, exchanges and information from multiple sources. Most scientific breakthroughs bring as many questions as they offer answers. This incursion into a Universe that remains to be discovered gives the impression to climb a path more and more steep and less and less practicable.
The employee tone would like to be pragmatic, open and devoid of scientific claims and stripped of judgements of value. Respecting a relative coherence,

took precedence over the rest, with doubt for alone certainty. We may wonder whether we should not think in a less conventional way by seeking points of support that are not the ones we would choose a priori.
With great application, while avoiding the immoderate use of the conditional, it was a question of particles, forces, link-lines, symmetrical dimensions, hidden interactions, singularities, fluctuating time until it disappears, of space that distorts until it disappears and other concepts so far removed from our reality.
These terms give visibility to phenomena that escape us essentially by clarifying as much as possible, the subject.
We need answers that are validated by proven experiences and confirmed by crossed observations. Although providing constructed and coherent answers, this theory of the Whole segmented by unavoidable levels of scale, does not fully meet these requirements and can only leave on a feeling of unfinished.
But what is the true truth?

Who would not admire these particularly brilliant researchers and thinkers - they are not so numerous - who mark this reconstitution of a Universe so concealer to us? They have inspired this reflection, which is not free of gaps and personal interpretations that call for controversy. We can only see emerging phenomena which have unrecognized links with discrete interactions predicted between quantum symmetries. We realize that we are more and more difficult to have appropriate tools to demonstrate mathematically or to test experimentally.

We perceive light (EMW) in wavelengths between 400 and 700 nanometers: our visual field quickly shows its narrowness. We are sensitive to sound at frequencies between 20 Hz and 20,000 Hz: our listening capacity does not go beyond that. We manage to support an environment between +60° and -40° with contact time at extremes, quickly reached. Normally, we only perceive that proves to us within the limits of our feelings.
However, more and more sophisticated tools of technology and reflection, allow us to note today the presence of wavelengths, sound frequencies, temperatures, speeds of movements very outside these limits. This progress may suggest that we should be able in a long-term to understand what makes us what we are. This would mean also that, at a very advanced stage, science supported by technology would no longer have any reason to advance having proven and demonstrated everything that could be done. Is it not showing an

excess of optimism to think that one day, the Universe will have no more secrets for us?

The human species in its evolution has endowed itself with cognitive capacities, which go in the direction of a better awareness but which remain primarily likely to meet our most present expectations and worries. The memories left by personal trials and the enrichment of a collective memory, unconsciously influence how we perceive what contributes to our living environment. In other words, we only see what we can see physiologically and more particularly what our most basic preservation needs, in particular, require us to see first. This peculiarity is not only peculiar to man. Since the unicellular organism, it singles out, to varying degrees, all forms of life and quickly shows quickly its limits.

Now, let us take this further. We should ultimately ask ourselves whether we have the potential to understand a reality so different from the soft vision that our condition imposes on us. Our recent immersion in the quantum “dimension” shows us that the macro world that is offered to our gaze is only a dressing to our liking of more complex phenomena and that we are only beginning to sense.

The subsidiary question would then be to know if a form of artificial intelligence disconnected from all felt, could give access to a cosmology that we feel so different from our standard model? Such a project would aim to make us discover, without a filter, the infinitely small as the infinitely large. there is no basis to assume that AI could contravene the collapse of the wave function and consider the superimposed states prescribed by quantum mechanics. But in any case, a future supported by machines equipped with artificial intelligence seems rather promising.

Let us return to earth! We bathe in space and we pass through time. But what becomes of space/time without observers? This absence of observer then amounts to depriving space and time of their raison d'être and the reduction of the wave packet then loses all purpose. Our understanding of the Universe would therefore result from a kind of mirage in which we would inscribe ourselves as an operator of quantum decoherence and by way of consequence inventor of temporality in a relativistic space to our measure. It can also be a way, even if it is particularly frustrating, to answer the great question: what is the Universe and what is really our place in it?

Since your reading has led you so far, it is time to confess that the objections, hypotheses and refutations formulated in this book have no other pretensions than to «shake the coconut tree». Should we not reconsider some of the default theories, assumptions and interpretations? These few lines are there to recall in particular 2 points put aside too often for scientific convenience:

- the mathematical uncertainty in quantum physics. Gödel's incomplete theorem has shown that any mathematical system capable of proving the basic theorems of arithmetic will necessarily include elements whose truth value cannot be proved using the axioms of the system in question.
- the problem of a «patchwork» cosmological model.

The difficulty is that we perceive and try to understand our environment by logical reference to everything that, in one way or another, represents or refers to the matter. This form of energy from which we cannot detach ourselves, does not allow us to understand and define what energy in the ground state really is. Answering it is essential to advance in the understanding of our Universe.
These few lines would like to shed new light, especially on this kind of problem and broaden the debate.

You can find this book in free reading and downloadable on:
https://www.edition999.info/IMG/pdf/the_universe_in_one_uniform_model.pdf

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Thank you for taking the time to read me, by allowing me the right to error.

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