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Grand Gravity and X-Theory.
On the Unification of Relativity and Quantum Mechanics

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Einstein's Relativity placed speed of light as a constant and unreachable speed c and since its publication, no absolute reference can be found in space, appearing the concept of spacetime. However, Einstein blurred some questions about the postulates of Relativity. Then quantum mechanics appeared, and Einstein was reluctant to accept it. That may be due to that, even though Relativity postulates and axioms are well established, they could rely on empirical assumptions. Einstein tried and failed, to make some of them constant (he called one "his biggest blunder"). Based on that, Wigner's, Böhr's, Gödel's, Bohm's, Schrödinger's, and EPR's observations, we found that those empirical assumptions were founded in axioms that might be as correct as wrong. Whether correct or wrong, the aforementioned axioms are unparalleled to nature, and we found that for our theory to be proven and correct (as well as almost any other theory) a specific mathematical model ought to be devised to match it specifically, yet for any process in nature it depends on the very interaction of physical laws. So an outright computation would define "reality" yet not nature or the process of formation, and the mathematical model usually is only relevant to the specific and beforehand determined query, under the system of mathematics used, being not possible to prove when the answers are beyond the mathematical system itself, in accordance with Gödel's and Wigner's caveats. Following those forewarnings, we found that another possibility can be contemplated regarding the universe, and, in those terms, and following Mach's principle which even Einstein took into account, quantum mechanics and Relativity unification could be possible. Since, physics in nature, and the physical properties of the physical world do apply and work regardless the existence of mathematics, and the definition of the physical world (and its measurement), we set a paradigm in which the aforementioned unification could be possible. To our surprise that paradigm and the model excogitated from the X-Theory, worked better and was more relevant than current accepted Big Bang models, to our universe and our physical world (even in quantum terms) allowing to explain the early universe, its expansion, the multiverse interpretation, and possibly, the quantization of gravity.

Keywords: EPR paradox, universe, theoretical physics, Hilbert Space, X-Theory, Theory of Everything (ToE), cosmology

Introduction

We are in the very first second of the universe. To us, and for everyone, Einstein's relativity applies. It means that, we have our gravity, every planet has their inertias and gravities, and we can count our time and rotary movements from our point of view, related to another point of reference (relativistic). We called it time (t) which can be counted on those terms and serves to the purpose of measuring such movements and properties,

creating a relative framework (different relative, points, and coordinates, to set comparative interrelated references (to set a "zero")) to make the measurements from.

Then, we defined time (t) as the unit we use to measure the change, or the absence of change, of systems.

However, as we pointed out in previous works (Bache, 2021a; 2021b; 2022a; 2022b; 2023), we can consider an absolute zero, or absolute reference in space, based on a persistent point in space, that we called x', from our review of the most prominent works of the XX century in Physics, the interrelated mathematics papers, axioms, and concepts of advanced mathematics since Set Theory and Cantor's Theory and paradoxes (Cantor, 1874; 1878; 1883; Russell, 1902; 1903; Zermelo, 1908; Fraenkel, 1922), since 1870, and the foundations of Physics of the early 1900's-1920's; we related to the possibility of a Schwarzschild singularity made out of two black holes entanglement in the origin (place we called x') that crossed each other (whether they "swallowed" each other, they are hitting each other, or they somehow keep "crossing" each other in a process towards each other's event horizon), appearing a real field due to their entanglement and complete crossing (truly and really crossed, yet "ongoingly", appearing a process of expansion, or a universe in expansion), or the imaginary effect (an effect, which we set in two possibilities: either the existence of a pulling negative vacuum generated from diverse possibilities; or the imaginary effect (perhaps real, perhaps kept as an effect) of the crossing of each black hole's event horizon crossing, whether the emptiness and any kind of vacuum or negative vacuum are pulling out from the Schwarzschild singularity) that we linked to the imaginary number (i), in the Schrödinger Equation $\hat{H}\ |\Psi\rangle = i\hbar\frac{\partial}{\partial t}|\Psi\rangle$ and we thereby excogitated a paradigm to overcome the imaginary part of the complex number $\sqrt{-1}$ as $\pm\sqrt{-1}$ to consider and contemplate a: (a) dual paradigm real and imaginary (effect) paradigm; or (b) either a real or an imaginary (effect) paradigm. Therefore Quantum mechanics could be possible in that paradigm, and, the zero position (x') would be an exception to Relativity (the only exception) yet keeping it perfectly possible to be both acting at the same time (keeping symmetry), but on the foundation of a universe emerged from the entanglement of two supermassive black holes, and a Schwarzschild singularity made out of those two supermassive black holes (Bache, 2022b; 2023), instead of only one black hole (Schwarzschild, 1916).

Thus, even though for continuous functions it is not possible to span from R^2 to R^3 (R^2 cannot be onto R^3), we found that, in that paradigm, even for continuous function (we did not assume the universe to be continuous, not the opposite either), T: $R^2 \rightarrow R^3$ could be possible, meaning that, for the universe (and Physics) landscape (nature), it could be possible to span our very Schwarzschild singularity, or the very origin of our universe entangled in the very point x' as a point in one dimension, in the Minkowski space, from 2D to 3D. So that, for the relativistic framework, spacetime would be plausible to span (our framework) from 4D to 5D, to consider then our universe to be a singularity on 5D, instead of the 4D proposed by Einstein's Relativity.

Mathematically it defines that an imaginary number (i) is equal to the squared root of minus 1: $\left(\sqrt{-1}\right)$ which is equal to an entangled singularity comprised by two black holes, and that that is equal to the inversion of the aforementioned singularity. Whether the impact of the paired-black holes hitting each other, or the mutual crossing due to one black hole "swallowing" each other (passing the event horizon of each other), the quantum effect of their entanglement may produce a field, which is a 5^{th} dimension (a rotating field or its equivalent, that is, space/time/time/time), generating a Grand Gravity (GG), which may include (that field) our "time" and our own gravity (whether we called it relativistic gravity or quantum gravity). So that $R^2 \rightarrow R^3$ and the function would include another tensor, which is the position 0 in the x axis of the entanglement of the two

black holes: x (0, 0); y (0, 0); and x' (0, 0), and it yields us the following spanned matrix:

$$\begin{matrix} x \\ y \\ x' \end{matrix}\begin{Bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{Bmatrix} T: R^2 \rightarrow R^3$$

We did that taking into account mainly Einstein (1936) work we reviewed in 2015, and Böhr's, Bell's, Schrödinger's, Wheeler's, and even EPR points of view, we started to review in 2015; following their recommendations, requirements, and suggestions, and 'T Hooft (2001; 2005; 2014) blueprints as well. And, based on those, we took the steps to make our own suggestions, and we reviewed and criticized some axioms and the exactness of some constants, theorems, and postulates, from a strict point of view.

Discussion

1. First, we reviewed Special Relativity postulates (Einstein, 1905; 1913; 1916), and we found: the 1st Postulate, even Einstein skipped the question and blurred it in his works, as he did when he established c (speed of light) as a constant. Regarding the 2nd Postulate, it is a well-established postulate, which works for almost the entire universe, saving the place (x' position) we created a possible paradigm to, looking at the suggestions of 'T Hooft and Einstein himself, EPR, and keeping in mind Bell's proposals, set the possibility of the unification of both theories, Einstein's Relativity and Quantum mechanics for the universe.

2. If c was an approximation, not completely correct, and not unreachable in Euclidean metric (Yahalom, 2013), then we reviewed it, and placed the perspective of the universe (spacetime as the mesh of the universe) to be measured the expansion from a point of view similar to the context in which a wave like light was measured and set as constant and unreachable by Einstein to his theories of unified fields. In that context, we found that, as the universe is expanding (Hubble, 1925; 1929; Lemaître, 1927; Perlmutter et al., 1998; Schmidt et al., 1998), we could translate space (the expansion of spacetime, of the very fabric of the universe) into a moving particle, in a linear instead of a 3D or a 4D as a metaphysical filler (the expansion of the universe in a linear way, instead of a 3D or 4D expanding entity), in such a way that, when we did that, we observed: First, we could translate the speed of space (V, as Volume of space, but also as Velocity or Speed of Space/spacetime) to a linear speed in relation to speed of light (c) as a sphere, but also its inverted (as a sphere in expansion, when we regarded the universe to be in expansion, or, as it was regarded as two black holes crossing each other, whether only crossing their event horizon, or "crossing" towards each other's event horizon; or in inversion, or any kind of inversion due to an imaginary pulling effect, or a real pulling effect generated from an infinite "nothingness", or a receding nothingness that was leaving a negative vacuum); second, if we regarded the universe as a 5D entity, the 4-dimensional spacetime could be expanding by some kind of action over it.

We hereby note that it is a 5D model as the model of Kaluza-Klein (Kaluza, 1921; Klein, 1926) but unlike the Kaluza-Klein model, this is a model in T_0 (regarding the compatibility between Quantum theory and Relativity) in which we did substitute time (t) for a cyclic movement of rotary nature of the system as a whole, that being cyclic, fulfilled all three aspects: conservation of Heisenberg Principle of Uncertainty (and others philosophical requirements such as Schopenhauer's and Leibniz's sufficient reason); the inner content of the system(s) is another ensemble of systems (emerged from a primordial ensemble of systems, as it was required by Einstein, 1936, p. 375) of complex nature that provides of relativistic laws, and can be used to set relativistic

frameworks, yet it is in expansion, and it keeps enough randomness for the Uncertainty's frequency-position trade-off; it can be regarded as a dual particle/wave system(s) (ensemble of systems) that can provide of inertia and a renewing spin to celestial bodies, and a superluminal manifold (faster than light in its expansion) or spacetime, that can offer a suitable landscape for black holes to appear and exist, and a paradigm for the system(s) (ensemble of systems) to be self-priming, yet to still keep the 2nd law of thermodynamics. And that system, being an ensemble of systems, and since the correspondence assigned of each other's wave to each element (supermassive black holes comprising the Schwarzschild singularity), is, and keeps, being a matter of choice; it could be also regarded as a quantum process. This theory (X-Theory, Bache, 2021a; 2021b; 2022a; 2022b; 2023; Bache, Rodríguez Sánchez, & Ries, 2022) is an educational theory, as it was devised by reviewing the problems of the current physics, and checking and contrasting them to science premisses, and it emerged from "critical thinking" and constructive critical opposition to the exclusion of "nothing" as an element of a possible Theory of Everything (ToE) made by Michiu Kaku in a communication to a documentary about science, physics, and mathematics; and reviewing it, we proposed first a new theory for the ToE, as a candidate for a ToE including "nothing", and we found an empirical assumption (some actually) which we either refused or we "quarantined" and set our postulates in previous ontological assumptions in order to devise a theory in a new direction taking into account and projecting tangential lines of thinking.

3. A critical point of view was applied to the current state of Physics. In his famous essay "The Unreasonable Effectiveness of Mathematics in the Natural Sciences", Eugene Wigner himself, a Nobel Prize awardee physicist, wrote that the correspondence between pure mathematics and the natural world was (sic) "something bordering on the mysterious.". "There is", he said "no rational explanation for it" (Wigner, 1990). The work of professional mathematicians often involves incredible ingenuity and extraordinary feats of logic. Some theorems, proofs, and theories sometimes take years to work out. And yet, astonishingly, many of the most insanely abstract concepts, yet brilliant concepts, turn out to model the real world phenomena. That is the case, for instance, of Einstein's Relativity, which the world and science (especially physicists) tried to dismiss since it was first formulated in 1905; then becoming a field of development for Einstein until 1917, then proven in 1919 (Einstein, 1931), finally becoming a field of development for the world and science (especially physicists). That is mainly because mathematics was developed to describe things in the everyday world. One can understand the origin of things like counting and addition, and how to calculate area or volume. However, as Wigner himself goes on to argue, "this simple explanation fails to account for so much of what the real world is (becoming) whether we see it or not". Yet one usually tries to match what is mathematically defined to nature (even when most of the time, things in nature are ongoing or "ongoingly" processes for lack of a better word). And sometimes (especially in science) one even dares to set the outright mathematical definition onto nature and the real world. That is to say, as science overly considers, if a shepherd does not count how many sheep the flock has, or how many grass flecks the sheep have eaten, the shepherd will have no sheep, or the sheep would have not eaten grass at all, either. Let us consider for a moment just how extraordinary this is. We have this set of things our minds seem to have produced in an abstract, non-physical realm of ideas. And we have another category or set of things we will call "things the universe does".

In that sense, one may propose that one can define "reality", as it is, defined and outright, computed and determined in time (t) by calculation and measurement. Yet, recalling Einstein (1936) words "an ensemble of systems" for the wave function ψ, one may still blur that measurement, in present time, according to quantum

mechanics and statistical mechanics. Therefore, since one could set a measurement and make outright calculations, once done we could move on to the real world, in which things are constantly changing in time (t), yet they are also changing independent of time (at T_0), i.e., independent of our time and measurements (Heisenberg, 1927; Schrödinger, 1935a; 1935b; Bohm, 1951; Bell, 1964; 1976; Aspect, Dalibard, & Roger, 1982; Zeilinger, 1986); and one may argue that "reality" is the past, actually. We might then define processes, and mathematically formulate predictions, establishing relations and correlations between events and phenomena, and sustain our works in axioms and empirical assumptions. Thus, we would obtain a mathematical model of R^2=0.86 or 0.8 for that purpose (not by chance, for those circumstances). Then we predicted that a body always goes down (we made it constant). Then, as history unfolds, we discover that there is "exact" correspondence between the mathematical model and concepts, and the "things the universe does", a kind of remarkable overlap between what is going on in our minds and what is going on out there. And very often, the math was worked out long before we went looking out in the world for a fit.

However, if that body is on the firm floor or on a table, it is not going down; if the Body 1 is "falling" towards a "falling" Body 2 in that framework, it would be "not falling" or not possible to determine if the Body 1 is falling or not (Relativity). Then "we went to space". So, even in the 0.86 paradigm, 0.14 could be circumstances or some particular changes in the "law" due to new physical laws apply. And then, new possibilities, physical properties, and physical laws play their role changing completely the 0.86 initial paradigm, as the physical laws itself may interact (the interaction of physical laws usually yields to change of usual observed behaviors, and the possible emergence of new properties yields new physical laws, or their discovery). In that regards, we have a few examples for physics "constants" such as the "cosmological constant" Λ, gravity on Earth, or the "gravitational constant". Had not that 1919 Eclipse been observed by chance, we may have not accepted Relativity. At least Einstein was open-minded after a decade rooting for the cosmic proof. But even him opposed to quantum mechanics, until proven in 1982-1986 (Aspect et al., 1982; Bell, Clauser, Horne, & Shimony, 1985; Zeilinger, 1986) enough to take about 50 years to be "almost accepted", and he opposed to almost anything against determinism, and Relativity, as he almost outlawed Minkowski geometry on the possibility of damaging Relativity, until it was found to work in favor of his theory.

As we previously stated, one may discover a kind of remarkable overlap between what is going on in one's mathematical model and what is going on out there. Very often, though, the math was worked out long before one went looking out in the world for a fit, because sometimes, it takes some time to look out in the world for it to fit. As we previously proposed, that could be due to the circumstances (that the same circumstances, or the appropriate circumstances appear). But, we also noticed, and proposed in this work, the importance of the quantum properties of the world, the environments, and things out there, in the real world, especially in nature. We can easily conceive that a tree follows Fibonnacci series and φ ratio $(1+\frac{\sqrt{5}}{2})$ in its development. Yet, if it could exactly match that series and ratio, we may state that the applicable laws (or its effects) are constant, and that our proposal is not right. Then outright computation and predictions would exactly match. But sometimes the empirical assumptions and the axioms are not strictly true nor reliable either beyond the punctual model devised for a punctual question (Gödel, 1931; 1938; Cohen, 1963).

4. We reviewed the proposal of Carl Sagan (1980) and the general proposals about the dimensions and their respective and linked (corresponding) geometric assigned correspondences. And we noticed that, for the

second and third dimensions (also for the fourth) the given correspondences were right, but for the first dimension, it was not quite right. As Sagan (1980) explained, it was attributed for the 2nd dimension a square (and any polygon of such metrics, which sides matched x and y coordinates, two coordinates, i.e., two dimensions); and for the 1st dimension, it was attributed a line. However, as we pointed out in previous works (Bache, 2021a; 2021b; 2022a; 2023), a line would have two dimensions (x, and some y) actually. And the following postulates were posited:

If 1 is massive, and especially if 1 is massive, it needs to stay active to go nowhere.

Even a line has 2 dimensions, so an infinitesimal point is the true 1 dimension.

Even though physical matter can be regarded as flat, no physical matter can be found in 2 dimensions in nature.

Therefore, according to the previous, the X-Theory (proposed on the basis of a $2^{\mathcal{P}|\mathbb{R}_+^*|}$mass X-Volume sphere) also was sustained in the existence of that very point, one dimensional, but also in three dimensions in a Minkowski space, and following the postulate for nature, in which we proposed that the correspondence for a 1 dimension will be (from our point of view, it is) a point (Bache, 2021a; 2021b; 2022a; 2023) which you can calculate and attribute a length and width, if it is placed as a theoretical point (drawn) in two dimensions, but it still would be partially leaving some space out of the true polygon, so that, the figure of that very point can correspond to a false "2-dimensions" figure (one dimension actually) or to a figure with a very centre, which is reduced by the intersection of two lines, yielding thereby a new, infinitesimally reduced point, appearing a X, and the very point (reduced point or centre of the figure examined) a true one dimensional figure, or 1D. Yet, even in that case, it was kept that, even that figure, in nature, will still and could still be regarded as an object with length, width, and height (some height), i.e., in three dimensions (length x length x length) as a sphere or a ellipsoid figure, regarded as a sphere in the previous works (Bache, 2021a; 2021b; 2022a; 2023), as the infinitesimal X could be spanned as a multidimensional or multiple Xs (exes towards the surface and its hypervolume) and then, reduced to the infinitesimal volume of their intersection (the intersection of the multiple lines crossing each other in their very centre), so that, appearing our true one dimensional point (again), and the proposed, infinitesimally reduced sphere or hypervolume (shrunken into a X-volume). It is noteworthy to say that, as it was regarded by those previous works (Bache, 2021a; 2021b; 2022a; 2023), as it can be spanned and placed as vector (or tensor) lines from its very centre (from the intersection or the centre of the multidimensional X) outwards (generating a hypervolume), since the vectors (or tensors) could also be spanned inwards, that hypervolume was completed (or also regarded) as an inverted sphere, when the same process aforementioned or previously depicted was performed from the infinitesimal (unidimensional) point, inwards.

5. Then, we first proposed the possibility of a self-priming system, that could be both, containing an infinite energy (from an infinite mass Schwarzschild singularity, that we recall it was proposed to be made out of two supermassive black holes) and keeping, thus, the 2nd law of thermodynamics, as the energy was already into the system; and providing of energy to the system, since any kind of process, it could be splitting the mass of the Schwarzschild singularity to provide of mass (celestial bodies) to the system called universe, and kinetic energy (either spin, inertia and/or warped and dissolved mass) to the system as well. In that paradigm, we proposed the Schwarzschild splitting, dropping and/or launching pieces of masses, some of them as black holes, which would be allowing the system to expand.

This is possible regarding the Painlevé and Gullstrand's proposals (Painlevé, 1921; Gullstrand, 1922), in the way of a flow of mass and spacetime from the very Schwarzschild singularity (and maybe from others black holes as well), as it was flowing like a river (like in the "River Model of General Relativity", Hamilton & Lisle, 2008; Braeck & Grøn, 2013), for a 3D paradigm of Special Relativity (in Minkowski space), and with our proposal of two entangled supermassive black holes, as a self-priming (of energy, mass, and spacetime) system for the universe, to solve the quantum effect (to unify both paradigms). The speed of space (V) proposed was of such magnitude, that it could warp spacetime itself (the previous, already existing, fabric, as it is expanding, while it is in expansion), and the rippings could be both, a suitable place for a black hole to land on, and a perfect candidate as a spot for black holes to be necessary and to land on (due to physical properties of both, the rippings and the black holes).

6. Finally, we proposed a possibility for such self-priming system (up to this point, the aforementioned, it was only to direct the expansion of the universe), to have a new property or complex behavior; since we deemed the universe, to be a 5D self-priming system (of energy), we considered it also to be a 5D self-priming system (of movement, spin, or inertia). Then, whether for the two opposite extreme entities, "nothingness/negative vacuum" and "everything", or for that with two supermassive particles (we related these with the hypothetical tachyons), we consider better to be moving in a complex 3D (rotary or angular movement) and a linear added movement (4D, or vorticial therefore), based on Gödel's, Keith's and Fremerey's observations and experiments of that nature (Gödel, 1949; Keith, 1963; Fremerey, 1973) to avoid disintegrating its own mass; or for a whole system, that was based (and fixed) only for an exact point in space (x' origin, or absolute zero in space), we devised a very likely movement of rotary nature (for the whole system), impacting or influencing, the whole content of the universe (i.e., a quantum effect). Then, we proposed some theorems for that approach (Bache, 2022b; 2023) and we concluded that, for two independent, yet entangled systems, they could have an inter interfering-interfered wave in superposition, springing from two unparalleled waves (one for each supermassive black hole), one matching the $\sin\theta$ wave, and the other, equivalent, yet matching the $\cos\theta$ due the waves offset (or also the $-\sin\theta$ for the consideration of the inversion circumstance or process).

The theorems were solved, for the fundamental issue in Relativity theory (If all the motion is relative, how is it possible to measure the inertia of a body?). We therefore approached the solution (Yet, the postulates of Relativity can be quite right for almost the entire universe; we only set the exception). The only way it is possible is by measuring it relative to something else: Yet it can be achieved in both ways, from a specific position fixed as zero, yet being both relativistic (both moving objects) and we can use even a third or more to establish complex, relativistic, reference frameworks (Relativity); and starting from an absolute position, which we already fixed as the absolute origin of the universe (and we called it x'), which may serve as an absolute point of reference if we find it (and if it, indeed exists) and we will see, it is not so easy to understand, but it can be quite understood as a possible quantum position, and a relativistic reference as well. As we previously proposed, one supermassive black hole, it may be corresponding (its wave) to $\sin\theta$; and, the other, to $\cos\theta$ ($\cos\theta = -\sin\theta$). That, we deemed, was as a result of a waves offset. Yet, which one is corresponding to $\sin\theta$ and which one is corresponding to $\cos\theta$ (or $-\sin\theta$) depend on which one we attributed as $\sin\theta$, for instance, in the first place (or which one we decided to assign the $\cos\theta$), therefore, becoming a matter of choice (quantic, Wheeler, 1978; Vedovato et al., 2017).

Moreover, if the universe is spinning at the same rate that the celestial bodies are, it would be not possible

to determine an absolute point of reference (and it would nullify the possibility of the rotary nature of a 5D universe as a system, and the Grand Gravity (GG) for the whole universe, as a system). But if, either the background of the universe, or the celestial bodies, are not spinning by themselves (or are in a different rate in an intrinsic spin), then we can find out if one of the theories is wrong, and/or if they can be unified.

Then, we considered a Mach's point of view (Mach principles, Mach, 1883; Einstein, 1913; Weinberg, 1972; Barbour & Pfister, 1995), and we applied Brans and Dicke's (1961) approach, which proved that gravitational constant (G) can be changing, without changing any of the theories (neither Relativity nor Quantum Theory). So, from a first approximation, it seems that there is evidence for a Grand Gravity, and a system, universe, which unpaired waves, and its superimposed wave is impacting the gravity of the bodies in its inner space (spacetime), i.e., of its content.

Mach's approach suggests action at a distance, so, we now will apply a close approach towards the Quantum theory contributions and propositions.

Hoyle-Narlikar Approach

First, we refer to the Wheeler-Feynman Theory (Wheeler, & Feynman, 1945; 1949), in which a Particle A generates a direct particle field defined by $F(a) = 1/2[F^{\mathrm{R}}(a) + F^{\mathrm{A}}(a)]$; the universe as a whole generates a response to these individuals fields of the charges and the "correct" response from the universe to the interaction of A is precisely: $Q(a) = 1/2[F^{\mathrm{R}}(a) - F^{\mathrm{A}}(a)]$; it can therefore be shown that, for the "correct" response, the "future" part of the universe must be a perfect absorber of all "future-directed" (retarded) signals, and the "past" part of the universe an "imperfect" absorber of all "past-directed" (advanced) signals. Thus, in such a universe, if we added this response to the basic time-symmetric field of A: $F_{total}(a) = F(a) + Q(a)$, we get the net field in the neighborhood of A as follows: $F_{total}(a) = F(a) + Q(a) = F(a) = 1/2[F^{\mathrm{R}}(a) + F^{A}(a)] + 1/2[F^{\mathrm{R}}(a) - F^{A}(a)]$.

In this way, we obtain the total effect in the neighborhood of A to be a pure retarded one. So, a "correct" response, therefore, eliminates all advanced effects except those present in the radiation reaction.

Then, we define the following based in Hoyle-Narlikar (1963) approach:

$$m_a(A) = \lambda_{\mathrm{a}} \sum_{\mathrm{b}\neq\mathrm{a}} M^{(b)}(A) \tag{1}$$

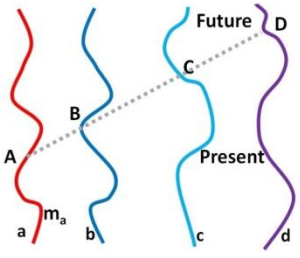

Figure 1. As implied by Mach (1883) and Mach's principles, the mass m_a is not entirely an intrinsic property of the Particle A; it also owes its origin(s) to the background provided by the rest of the universe. This can be expressed by the aforementioned formula (Equation 1) at a world point A on the world line of Particle A; the mass acquired by ("a") is the net sum of the contributions from all other particles except A, in the universe. The contribution from B to A is given by the scalar function $M^{(b)}A$. The coupling constant λ_a is intrinsic to the Particle A. We note that, if A were the only particle in the universe, $m_a(A)$ would be 0 (or the outcome of the computation would be 0).

So, in the Brans-Dicke Theory, we have $F = G\frac{m1m2}{r^2}$, and the possibility of a changing gravitational constant G from place to place, and with time (t), and in the Hoyle-Narlikar approach we have a mass, which is a result of the communication with the universe, meaning it changes over time (so mass will increase over time (t), with age).

Finally, we also have Sciama's proposal for the origin of inertia, which added an acceleration (a in the following equation) that yielded $F = G\frac{m1m2\ a}{r^2}$ (Sciama, 1953), adding an acceleration dependent term to the Newtonian gravitation equation.

It is interesting to note that Hoyle-Narlikar (1963) steady state model generates the correct response, while all Big Bang Friedmann and theories thereof fail to do so. And we used a similar steady state model.

In our proposal we added a 2nd mass, for a 2nd primordial particle to fulfill the ensemble of systems required by Einstein (1936) for the wave function of the universe. So that we suppressed the possibility of A being the only particle in the universe (at the origin) and we solved one of Mach conclusions for that paradigm. We hereby, added that 2nd mass to the Hoyle-Narlikar approach and it yields the following:

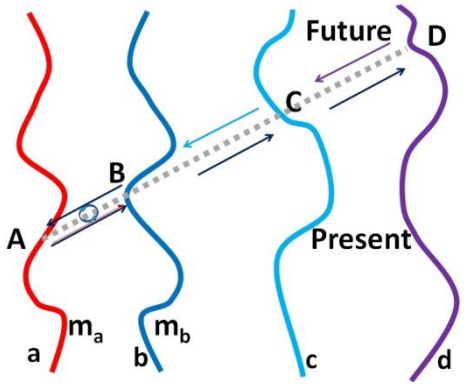

Figure 2. A second mass (m_b) was added to the model in Figure 1, so that, it appears a paradigm for both, an absolute reference framework, and a relativistic framework (if we have two particles A and B, between them we can create an absolute reference in respect to the others particles, but, it will be still relativistic between those two particles A and B). We present the model reframed in Figure 3.

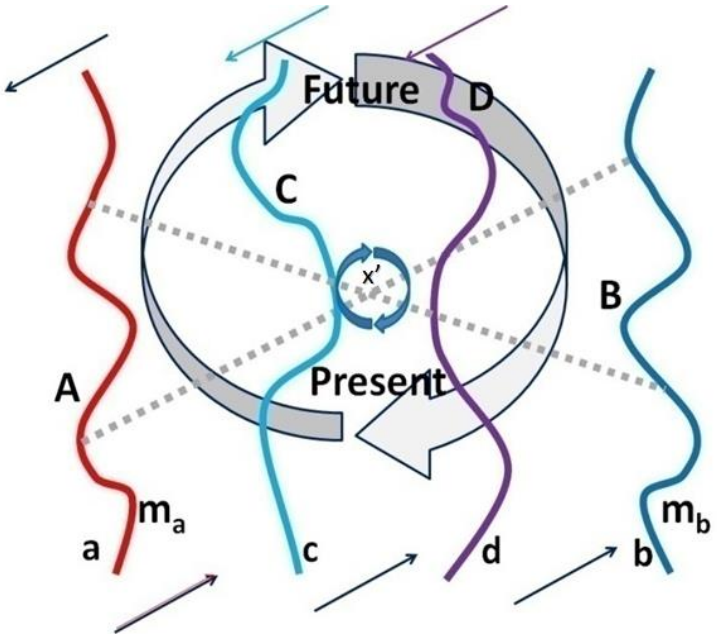

Figure 3. Quantum absorber model. Here, the intersection of the gray lines represents x' (a perfect absorber as the meeting point of m_a and m_b inertias). The arrows in gray/clear represent the non-linearity and a chaotic behavior of a quantum physical system which properties, including mass, change over time (t), at an inertial and totalized background that moves (rotates) in T_0 (independent of time (t)) as a whole, or like an ensemble of systems. The dark arrows (in the middle, and around the intersection or x') encircle the quantum nature of the system (uncertainty, and position, or position-frequency trade-off, from the statistical mechanics or the uncertainty of an ensemble of systems), and represent the interchange of inertias in the background of the universe in x' (the origin or only absolute reference or point in the universe). The distance between the dark arrows represents the quantization of gravity.

We presented an absolute framework, and reframed the Figure 2 and the Hoyle-Narlikar proposal, to obtain an approach in which Particles A and B can be regarded as both, an absolute point of reference (1/2 their distance r, or where they met, an absolute point in respect to the other particles in the universe) that we called x' and a relativistic reference (between them), and it set the possibility of a perfect absorber, and a movement of rotary nature that can rearrange points between future and present, so time reversal can be achieved for time, but not for the effects in space, yet those are not impossible either. And it appears a chaotic non-linear system, which is an ensemble of systems, as required by Einstein (1936) for the wave function of the universe. And we still would have to decide which particle is A (and m_a) and which is B (and m_b), so it is both, relativistic, and quantic (it depends on choice).

Thus, we present a new equation, as follows:

$$m_a(A) + m_b(B) = \lambda_a \lambda_b \sum_{b \neq a} M^{(b)}(A) + M^{(a)}(B) \tag{2}$$

And the Mach's 8th principle (Bondi & Samuel, 1997) is: $\Omega = 4\pi\rho G T^2$ where ρ is the mean density matter in the universe and T is the Hubble time (Bondi & Samuel, 1997, p. 123).

Conclusions

Since mathematics can be used to define "reality" in a determined and outright way, and one can use them to perform measurement (concretized "reality") and then predictions, it can be also concluded that "reality" is as exact as the previous instant in time (t), i.e., in the past. Therefore, concretized "reality" is the past.

The previous is due to quantum mechanics also governing the physical world and the universe (aside from Relativity), and statistical mechanics is applicable and relevant both, the future (predictions) and the present (current or during the measurements). This is in accordance with Heisenberg Uncertainty Principles and position-frequency trade-off.

Nonetheless, we were able to set an outright position in space (as the only exception to Relativity) by the intersection of two primordial particles (and their fields) in the very origin of the universe (in spacetime, i.e., in the very centre, and in its origin). So that, this very point is in accordance with both, Relativity and Quantum Mechanics.

That very point has been regarded as the perfect absorber pointed out by Wheeler and Feynman (1945; 1949), and allowed us to propose a new theory, and a new model, based on Brans and Dicke (1961) Theory and Hoyle-Narlikar approach.

That very point has been contemplated as the true one dimension, yet it could also be regarded as a 3-dimensions entity, even in a Minkowski space. That approach yields some interesting points of view, regarding the nature of black holes, the fabric of the universe, and its expansion.

As the expansion of this point can be regarded as spacetime (flowing from the singularity), its inversion also can be regarded as spacetime (towards the other side of the singularity). In those regards, both can be comprising the universe, and yielding an element independent of time (an "ensemble of systems") in compliance with the propositions for the wave function of the universe.

As those elements may be comprising the universe, its origin may be related to two elements. We found a way to span those elements to the complete spacetime (whether for a continuous or a discontinuous function for the universe) that extruded from 2D to 3D, and from 3D to 4D, it yielded a possible spacetime in 5D (a model of the universe in 5D, i.e., a universe at T_0, or independent of time), therefore, similar but different from Kaluza-Klein model.

That expansion (and/or simultaneous inversion) of spacetime could be faster than light, meaning that the expansion of the very fabric of the universe could be and comprise a superluminal manifold.

Our system considers the possibility of either a dual universe made out of two massive elements, or whether the existence of one or two primordial elements to generate the Schwarzschild singularity or a negative vacuum generated by a surrounding "nothingness" or a negative vacuum left by a receding "nothingness"; it could be also the primordial elements. In both cases "nothing" or a "nothingness" could exist, though in the second paradigm that "nothingness" playing a role is more likely. In any case, as an educational work, our review and theory (X-Theory) considered both possibilities from the very beginning, remaining in an ontological assumption and proposed a plausible model to unify Relativity and Quantum Mechanics, or to contribute to it.

Unintentionally, and unbeknownst, our model solves the dispute between different paradigms and approaches to the study of the universe and Quantum Mechanics. The proposal envisions the paradigm of multiverse[1] as an effect of the different possibilities of "reality" (past) to manifest before choice. Unlike the

[1] We especially hereby refer to the Everett many-worlds interpretation.

effect of a negative vacuum (physical), the Quantum Effects keep the world open to change, i.e., one universe with multiple possibilities and diverse choice (at T_0) for diverse paths before choice, according to the "Road Not Taken" paradigm (Frost, 1915; J. H. Flavell, Green, & E. R. Flavell, 1985; Abbot, 1988; Hock & Orkin, 2005; Buse & Weimer, 2009; Krapf, Weber, & Koslowski, 2012; Pender, & Lemieux, 2020).

This theory and the model excogitated from Hoyle-Narlikar (1963) and Brans and Dicke (1961), yet, also other models such as Penrose (1965; 2020), Relativity and String Theories (whether S-Theory or M-Theory) are more inclusive and fundamental, and considered "nothing" as an element of the universe, taking into account the philosophical specifications and premises, as well as the arguments of set theory, the foundations of physics, and the basis of Relativity and Quantum Mechanics frameworks. Based on those and Mach's principles, we found out a possible rotary nature for the universe to overcome the current limitations and heuristic of science. Further research is necessary regarding "reality", existence, and the universe.

We are in the very first second of the universe. To us, and for everyone, Einstein's relativity applies. It means that, we have our gravity, every planet has their inertias and gravities, and we can count our time and rotary movements from our point of view, related to another point of reference (relativistic). We called it time (t) which can be counted on those terms, and serves to the purpose of measuring such movements and properties, creating a relative framework (different relative, points, and coordinates, to set comparative interrelated references (to set a "zero") to make the measurements from.

Therefore, time (t) can be regarded as the unit we use to measure the change, or the absence of change, of systems.

But we are living in T_0 (a universe independent of time) actually (at what is called in Physics Planck time), because we are in the very first second of the universe.

In some way, every celestial body is in harmony with the superimposed wave of the two basic elements of the Schwarzschild singularity, but it seems that those two elements are not in harmony between them.

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In memorian of Hawking's work, and Einstein's words:
"On the shoulders of giants".

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