AETHEROMETRIC THEORY OF SYNCHRONICITY (AToS)

VOLUME II

THE GRAVITATIONAL AETHER, Part II:

Gravitational Aetherometry (7) -

ANTIGRAVITY LIFT AND EXOTIC FLIGHT (II): CRITICAL OVERVIEW OF THEORIES AND TECHNOLOGIES

By

Paulo N. Correa, M.Sc., Ph.D. & Alexandra N. Correa, Hon. B.A. Aurora Biophysics Research Institute

Revised & Edited by Malgosia Askanas, Ph.D.

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ABSTRACT

The present essay is the third of a group of four communications originally intended for publication in *Infinite Energy* at Dr. Eugene Mallove's invitation, and dedicated to the scientific, technological and political problems presented by exotic flight and lift systems - in particular those relating to possible control of gravity. We examine the main lines of research into the nature of gravity over the past 6 decades, with a focus on Einstein's General Relativity and General Theory of Gravitation, quantum-mechanical models of the graviton, Geometrodynamics and the ZPE theories, Van Flandern's model of gravity, which are contrasted to Aspden's theory of a dynamic Aether.

COMMUNICATION

Gravity research in the second half of the XXth century

"Whatever those who talk in terms of Laws of Energy Conservation, Einstein's theory and Newton's Third Law have to say about the impossibility of anti-gravity machines, the fact that they neither understand what underlies the force of gravity nor do they recognize the existence of the Aether renders their views irrelevant."

H. Aspden, 1987

We believe that the preceding monograph ^[1] gives a much more accurate synopsis of the research contributions from the 1940's and, especially, from the 1950's, to present day flight technologies, than other biased and often outlandish views that have been put forth in alternative flight and ufological publications.

With this in mind, we can now ask what are the pertinent developments, in the past five or six decades, in our scientific understanding regarding gravity? In our opinion, there is not much that deserves mention, in scientific or, even more significantly, in technological terms. Mostly, it reduces to theoretical contributions that have never been embodied by technological solutions, and thus have less promise than even suction-aircraft or electrical propulsion ever had.

"Someone told me that each equation I included in the book would halve the sales. I therefore resolved not to have any equations at all."

S. Hawking, 1988

1. The General and Unified Theories of Relativity

1.1. Inertial and gravitational systems

There is no need to rehash what has become accepted by Official Science as the new theory of gravitation, without - in our view and that of many other physicists - any real empirical evidence that substantiates it. Based on the axiomatic 'equivalence of inertial and gravitational masses', General Relativity dissolves the distinction between inertial and gravitational frames made in Special Relativity, only to ensure that the speed of light c applies not just to the propagation of electromagnetic field disturbances in all inertial frames defined by 'bodies that move uniformly and without acceleration' ^[2], but *equally* to gravitational fields and their propagation.

In his last book, and with respect to a relativity-based unified field theory, Einstein first proposes a phenomenological approach ('the principle of equivalence') where the inertial and gravitational frames are exchangeable: "the conception that K' [the accelerated system of coordinates] is 'at rest' and a gravitational field is present we may consider as equivalent to the conception that only K [the inertial system] is an 'allowable' system of coordinates and no gravitational field ["field of centrifugal force and force of Coriolis", when 'seen' from a system at rest] is present" ^[3]. Einstein readily admits that the principle of inertia is weak because of its circular petition of principle, and even wonders whether "there are at all any inertial systems for the very extended portions of the space-time continuum, or, indeed, for the whole universe?" ^[4]. He concludes that the laws of configuration of rigid bodies in either Euclidean geometry, or with respect to inertial systems, do not agree with the laws of configuration that apply to accelerated systems: "With respect to K all the rods upon the periphery [of the system] experience the Lorentz contraction, but the rods upon the diameter do not experience this contraction (along their lengths!)" ^[5]. He finds himself therefore forced to conclude that the gravitational field "determines the metrical laws of the space-time continuum", and thus that the geometry of "ideal rigid bodies" cannot be Euclidean.

This conclusion goes to the heart of the scientific nature of physics - to the problems of methodology, and what is and is not an adequate physico-mathematical description of a real "state of affairs", viz. with respect to both "inertial" and "accelerated" motions, and in particular the 'behaviour' of the gravitational field. Summarily, the question that it immediately raises is whether the approach charted by Einstein - which is based upon the concepts of field and relativity, and treats the "space-time" continuum as a Riemannian manifold - is adequate to understand and control gravity.

1.2. What is and is not physics (1):

A reductionist use of the field concept

In a famous, but now mostly forgotten, 1950 paper ^[6], Einstein is very candid about the scientific status of Relativity, in particular General Relativity. He formulates two questions which "a relativistic theory" *must* be able to answer - the questions that, in his mind, any relativistic unification of physics must address:

- 1) What is the mathematical character of the (total) field?
- 2) What equations hold for this field?

To answer these questions he raises a critical problem of epistemology, one that we shall summarize by rephrasing it as a problem of determining the real physical characteristics of the field before its mathematical character can be identified. From this perspective, however, the two questions are really one and the same; indeed, uncovering the physical nature of the field as a principle of variation would require an understanding of its mathematical character such that the principle would determine and give rise to the correct functions or field equations. But what Einstein initially means by the first question is: given a "choice of a field-type", how can it best be treated mathematically by a relativistic theory? This boils down to what are the coordinate transformations that apply to the components of a given field. Similarly, what he means by the second question - as he himself proceeds to tell - is whether the equations are capable of determining the field to an extent that "satisfies the postulates of general relativity". Plainly put, the physicality of the field is a given and depends on the choice of "field-type", and thereafter the mathematical character of the field relates only to coordinate system transformations (the four coordinates of an event in the four-dimensional continuum), not energy flux or energy conversions, and this reduces, in Einstein's program, to whether those transformations suffice to define the field in a manner consistent with a general relativistic theory.

As Einstein acknowledges, the program relating to these two questions is entirely theoretical ("a highly abstract program"), and at that, *entirely speculative*. But he acknowledges this in a manner that is most interesting, because it raises not only the question of the status of General Relativity as a scientific theory, or a nonscientific one, but also a much wider problem of epistemology concerning the "confrontation" of theory with empirical data. Whereas this confrontation is assumed, within the context of the scientific method, to be the sine qua non of the validation of a scientific theory, this is neither true of the history of science nor of the institutional acceptance that validates a theory as part of the corpus of Official Science. Einstein is well aware of this, and he now hits the integrity of the scientific method below the belt, as it were. What do we mean by that? Concretely, we mean that, in Einstein's argument, the confrontation with the empirical facts ceases to be the scientifically determinant criterion of the validity of a theory, to become merely "an important advantage" that "justifies" a "greater confidence" in the theory; then he adds: "yet, more and more, as the depth of our knowledge increases, we must give up this advantage in our quest for logical simplicity and uniformity in the foundations of physical theory" [6]. The so-called "advantage" - that which underpinned the scientific method itself - must be given up, in Einstein's opinion, because of (i) an increased depth of knowledge that supposedly demands the relinquishing of this advantage, and (ii) the demands of "logical simplicity".

Einstein's suggestion that the scientific method should cease to be the guiding torch of science - required as it may be to foster belief in the correctness of his relativistic theories - is deeply corrosive of science, period, let alone 'good science'. Moreover, it is based on flawed arguments, which in turn are a distortion of the real social and a-scientific pressures intent on destroying the value and the open practice of science, and replacing science and scientific theory with advertising gimmicks and organized peer-review 'sanction'. Yet, as a scientist, one would not know what knowledge there could be, or how knowledge could accumulate real depths, that would not be based upon - not some nebulous "advantage" of the scientific method - but its rigorous application! If there is "a corpus of knowledge" that demands suspension of the scientific method, of the confrontation of theory with empirical data, that corpus of knowledge surely cannot be scientific; rather, it is religious and metaphysical. So, the argument masks the nature of the social forces that seek to suspend the scientific method, and thus barr the real basis of a *free and systematic* inquiry into nature. Those forces belong not to science, but to the nature of social relations, in particular to the limitations which Power in all its forms - and, in particular, the Power of social ideation or confabulation (Bergson) - always seeks to impose on science, both on the freedom and on the method of its inquiry. In the recent past, the Church took on that role, and today it falls to the mass-media. So, all happens as if Einstein was simply acknowledging this reality but justifying it in such a manner that the method of inquiry could no longer be seen as the determinant factor in the constitution of scientific knowledge. And what does he replace this mere "advantage" with? His answer, most obvious indeed, is that "logical simplicity", which is arbitrarily dogmatic "mathematical rigidity" by another name, should replace the scientific method: "In favor of this theory [of general relativity] are, at this point, its logical simplicity and its 'rigidity'. Rigidity means here that the theory is either true or false, but not modifiable" [6]. Of course, his followers would have none of that, and went on to modify the theory and prove the ol' man wrong. But they no longer needed the criterion of method, that mere "advantage", in order to freely modify relativity: they could keep the skeleton of the theory (after all it was a composite of manifold contributions - Poincaré, Lorentz, Jeans, etc), but just add *ad hoc* fields, field properties and even field components.

Indeed, how could Einstein have thought that a theory which is no longer bound by the test of experience, by empirical criteria, could be so rigid as to be unmodifiable?

The real Achilles' heel of Einstein's theory of General Relativity is precisely the fact that it lacks sufficient observational and experimental validation (see below). It is ruled by an abstract "beauty" of the mathematical formulations and relations, but entirely abstracts from the actual physical processes of energy interaction. Even the notion of field, or "field-types" is a confused one, rooted in an inability to realize that the unity of behavior of distinct fields is not geometric. Yet, General Relativity has become universally accepted as a canon of Official Physics. Moreover, Einstein did not try to hide the dubious status of the theory; rather, he was forthcoming about it: "It has to be admitted that general relativity has gone further than previous physical theories in relinquishing 'closeness to experience' of fundamental concepts in order to attain logical simplicity. This holds already for the theory of gravitation, and it is even more true of the new generalization, which is an attempt to comprise the properties of the total field" ^[6].

So the critical question arises again and again: how could the properties of the total field, if there were one, or of a totality of field actions, be successfully comprised by an abstract mathematical treatment, if the physical nature of the fields involved was not adequately treated (and empirically tested as such), and even the fundamental concept and function of field not really understood or comprehended? One cannot comprise effectively a function that one does not comprehend. Adequate concepts are not separable from an adequate understanding or grasping of their functions, including their development or 'unfolding' *qua* concepts. Moreover, even though 'logicality' of articulation and simplicity in such logic are parameters that the scientific method also promotes, they cannot replace the empirical validation of theory, nor replace experimental induction. There is no criterion by which a theory is scientifically true by virtue of being logically simple. From the viewpoint of Aetherometry, it is readily apparent how Einstein's General Relativity of the total field, no less than any of the variants concocted by his various followers (Hawking's school, geometrodynamics, the ZPE'rs, etc), has misapprehended the physical nature of all energy fields:

• the physical nature of '*electromagnetic*' *or photoinertial fields* and their relation to the inertial frame of Matter;

• the physical nature of *electric fields*, where radiative propagation is not electromagnetic, or photon-mediated, but ambipolar, and the induced acceleration produces inertial effects (thus, it has misunderstood the outcome of the Kaufmann-Bertozzi experiments);

• the physical nature of the *gravitational fields*, either anchored to Matter or to the Aether lattice;

• finally, it ignored the existence of *primary massfree energy fields*, ambipolar and latent, and thus failed to understand how all the exchanges between any material particles - that together constitute the field singularities - are energy processes and, at that, massfree energy processes. No field effects without displacement of massfree energy - *that* is the physical nature of the field (we shall return to this below).

Accordingly, we're bound to ask from an aetherometric perspective: if no field can be treated adequately to its physical nature, what else but sheer imagination, freed from the scientific method, can claim to treat with "logical simplicity" a 'total field', whose confrontation "with empirical data is so difficult that so far no such [empirical confirmatory] result has been obtained" ^[6]?

1.3. The reduction of mathematical physics to topology:

A reductionist concept of the Spacetime continuum

Einstein answered this by openly admitting that his general relativistic theory lacked a valid scientific foundation. The theory of gravitation that he proposes does not move from the gravitational field viewed as acceleration by force, towards the field energy exchanges characteristic of the field, or towards the field components (the real gravitons). Instead, it sets out to define the coordinate system that permits description of the gravitational field. And where does Einstein go to get it? To the inertial system of coordinates he had used for Special Relativity, such that only the transformations vary, remaining restricted in SR, and "admitting" "arbitrary continuous transformations" in the theory of gravitation. Why should the coordinates and description that belong to inertial motion come to apply to the description of the gravitational field, just by becoming subject to "arbitrary continuous transformation"? Einstein gives two answers to this, one explicit, the other implicit. First, space and time with respect to an accelerated system cannot be defined as they were in SR with respect to inertial systems, but following the principle of equivalence, if such an accelerated system is taken

to be at rest, then a gravitational field arises with respect to it, which "determines [as non-Euclidean] the metrical laws of the space-time continuum" ^[3]. The reverse side of the medal is that there is no 'pure' inertial motion; all motion is accelerated and space cannot be conceived to exist without a gravitational field, whose embodiment is the curvature of Spacetime (or 'space-time', as Einstein preferred to write).

The implicit answer that Einstein never quite makes explicit is that he considers his topological treatment of the continuum to be an objective reality (see below). Somehow, that is a greater certainty in his mind than the empirical confrontation of a theory would ever be able to yield. Yet, let's examine this "logically simple" certainty. To define a relativistic theory of gravitation, he begins with light, where Special Relativity had begun. It is worth reiterating the argument so that the logical, mathematical and physical flaws will jump to the 'grasping eye'. Light is assumed to have a constant velocity, and to form a ray that starts at a point, from a point, designated by topological coordinates x_1 , x_2 , x_3 in a three-dimensional coordinate system, at a time x_4 . Here, coordinates x_1 , x_2 , x_3 directly signify lengths measured by unit measuring rods. Then, says Einstein, "it [light] spreads as a spherical wave and reaches a neighbouring point (x_1 +d x_1 , x_2 +d x_2 , x_3 +d x_3) at the time x_4 +d x_4 ", so that, by introducing c, we can write the foundational topological relation of Special Relativity:

$$\sqrt{(dx_1^2 + dx_2^2 + dx_3^2)} = cdx_4 \tag{566}$$

It is, effectively, an equivalence that postulates an identity between an abstract space described by transformation of coordinates taken as exclusive functions of distance (expressed in length units), and a time interval parametrized by the constant c, and treated as if the time interval were nothing but a distance equivalent. This identity operates as if it were an identity between Space and Time functions, and is foundational because it establishes the terms and the basis of the relativistic manifold. It is the basis for the next relation that Einstein provides, the relation which he considers as the one defining an additive four-dimensional Spacetime continuum - by the function which squares the continuum to permit its expression in terms of the c^2 constant:

$$ds^{2} = dx_{1}^{2} + dx_{2}^{2} + dx_{3}^{2} - c^{2} (dt^{2}) = 0$$
(567)

If we take c as unity, and introduce what Einstein calls the "light-time" *l*=ct, or the "real time coordinate", "in place of the time, t, in order that the constant c shall not enter explicitly into the formulas" ^[7], then the Lorentz transformation is defined by the co-variant equation -

$$\Delta x_1^2 + \Delta x_2^2 + \Delta x_3^2 - \Delta l^2 = 0$$
(568)

that is satisfied with respect to every inertial system. Lastly, by applying Minkowski's Spacetime criteria, SR replaces the "real time coordinate l" with the imaginary time coordinate defined by:

$$\mathbf{x}_4 = \mathbf{i}l = \mathbf{i}\mathbf{ct} \tag{569}$$

where $i=\sqrt{-1}$, so that the left side of the equation for the propagation of light in SR becomes the sum of four indistinguishably-treated squared length dimensions (the negative sign disappears from the term equivalent to Δt^2):

$$\Delta x_1^2 + \Delta x_2^2 + \Delta x_3^2 + \Delta x_4^2 = 0$$
(570)

This is always satisfied, says Einstein, if the more general condition

$$s^{2} = \Delta x_{1}^{2} + \Delta x_{2}^{2} + \Delta x_{3}^{2} + \Delta x_{4}^{2}$$
(571)

applies as an invariant subjacent to every linear coordinate transformation. The result is that application of the Lorentz transformation in this manner "is identical with the translational and rotational transformations of the Euclidean geometry" ^[7]. When it comes to GR, however, Einstein further invokes a particular argument - that one can always regard an infinitesimally small region of the Spacetime continuum as Galilean in the absence of a gravitational field, such that the directly measurable quantity is

$$dX_1^2 + dX_2^2 + dX_3^2 - dX_4^2$$
(572)

or its negative:

$$- dX_1^2 - dX_2^2 - dX_3^2 + dX_4^2$$
(573)

Either way, the expressions define a "uniquely invariant for two neighbouring events" of the continuum.

Expressing this in arbitrary curvilinear coordinates, where space-like line elements have a real ds, and time-like line elements have an imaginary ds:

$$-ds^{2} = dx_{1}^{2} + dx_{2}^{2} + dx_{3}^{2} - dx_{4}^{2} = 0$$
(574)

Defined in this way, the continuum no longer has a single metric significance; whereas the cartesian

coordinates x_1 to x_3 directly denote lengths, x_1 to x_4 denote, in GR, arbitrary coordinates that "number uniquely the space-time points" and satisfy the conditions of continuity. In Gauss's theory of surfaces, plane geometry is based in the concept of distance ds, between two infinitely near points. Now, when it comes to "regions of finite extent", Einstein claims they are not Galilean because "the gravitational field cannot be done away with". What is fascinating about this step of his argument is that he does not invoke any physical boundary that makes any extension finite (say, like the 'Planck's length', or a minimum wavelength that quantizes energy or angular momentum, etc), just assumes that distance may not be infinitesimally divisible ^[8]. But since there is no preferred choice of coordinates that SR can specify for the metrical relations of a finite region, then the invariant ds still exists for two neighbouring events of the continuum, but may be "expressed in arbitrary coordinates", so that, with respect to the coordinate differentials dx_i, ds² becomes expressible as:

$$ds^2 = g_{ik} dx_i dx_k \tag{575}$$

Now, he says, "as in the Special theory of Relativity, we have to discriminate between time-like and space-like line elements in the four-dimensional continuum; owing to the change of sign introduced [see equation #573 above], time-like line elements [now] have a real, space-like line elements an imaginary ds" ^[9].

The immediate problem is not the equivalence of this expression to the previous equations that topologically describe the continuum, but rather that, if the functions gik "describe the metrical relations of the Spacetime continuum and also the gravitational field" ^[9], then, since the gik describe the gravitational field by its acceleration component(s), the continuum defined by ds² acquires indeed a strange dimensionality equivalent to ℓ^3 t⁻², equivalent precisely to the dimensionality of *massfree* energy, rather than to the dimensionality of a surface. Yet, it is plain enough to see that no amount of massaging the equation for the four-dimensional continuum ever gives anything other than a proportionality between ds² and ℓ^2 , the dimensionality of a surface. Adding squared dimensions of length only yields squared lengths. Moreover, the reductions of timeline t to the real time coordinate l_{i} and then to the imaginary time-like line ict, are at best only justified for electromagnetic events defined as the emission, propagation and reception of a light ray with invariant speed c between any set of topological points. But why should these relations apply to the gravitational field? Why should one assume that the speed of propagation of gravitational disturbances is the same as that of electromagnetic disturbances? Moreover, on what basis is time treated as a single timeline, and on what basis is it reduced to a time-like length? Squaring a timeline representation may be a way to get at the synchronicity manifold of Time, but neither is time subject to the light speed c, nor is time reducible to a spacial representation that turns it into some area element. The crux of the criticism is that it is apparent that such a 'projected', flattened continuum could never describe an energy continuum, or

the superimposition of manifolds that forms distinct energy multiplicities. What is objectionable is not simply the abuse of the sign of addition to couple qualitatively different dimensions - especially when volume itself defines a space with dimensionality ℓ^3 (and *not* as the *addition* of three lengths or their squares) and thus makes explicit the powers of multiplication implicit in the exponent. It is the totality of the mathematical operations that underlie the reduction of the continuum to a flat map of four-dimensional points that one must object to; the relations are neither dimensionally valid, nor physically legitimate, for the continuum is an energy continuum, and there is no other reason for the apparent seamlessness or continuity of spaces and their 'transformation'.

Yet, Einstein comments on the invariant $dx_1^2 + dx_2^2 + dx_3^2 - c^2 (dx_4^2) = 0$: "This expression represents an objective relation between neighboring space-time points in four dimensions (...)".

Well, we must ask - does it? It wants to be a representation of an objective physical relation, but in fact it is simply the paralogical result of a series of faulty assumptions that Einstein wants to transpose from the world of light to the world of gravity. He says that space and time should not be confused, that space remains volumetric, as in Euclidean geometry, and time is a single dimension, as it was for Newtonianism, yet only spatial line elements remain in the Minkowski four-dimensional continuum of Spacetime. This situation only gets worse when Einstein transits from the Special to the General theory; the former still had a metric related to the electromagnetic constant being taken as an absolute invariant (a much more fundamental absolute reference than reference to its result, the Spacetime continuum, despite Einstein's claim to the contrary), and so tries to make physical and topological sense of its object of study. But when it gets to the theory of gravitation and the general theory, and tensors come to specify complex metrics totally divorced from concrete energy conversions or transformations, or any knowledge thereof, the metrics disappear and leave only a topology bound by a certain use and theory of geometry. Even the departure point, the dogma of the fourdimensional map, can never be synthesized with a physics of energy or a metrics of 'endoreference', and very basically so because energy implies a Time-manifold that is distinct from a Space-manifold, and thus a 5-dimensional continuum, a complex manifold of submanifolds that cannot be flattened or spatialized. In fact, what Einstein was after in the generalization of the relativistic theory, was a representation of energy in the more general form or equivalence of that invariant (and not the physical logic of energy that establishes continuity by superimposition) which Einstein writes as a tensor field equation:

$$\Sigma_{ik} g_{ik} dx_i dx_k = 0 \tag{576}$$

The recourse here is, of course, to a Gaussian theory of surfaces extended by the Riemannian theory of manifolds with arbitrary numbers of dimensions. In the generalized calculus of tensors, Gauss had introduced a system of curvilinear coordinates that satisfied the conditions of continuity (for a topo-

logical space), but were entirely arbitrary, ie devoid of metric properties. Riemann extended Gauss's two-dimensional theory of curved surfaces to continua with any arbitrary number of dimensions (no different than adding areas..., as if the root of each area were the coordinate of a point); this now permitted Einstein to invoke an expression that would be valid for an arbitrary choice of the dx_i. Yet, note that Einstein claims this was an extension of a "theory of surfaces to spaces of an arbitrary number of dimensions (spaces with a Riemannian metric, which is characterized by a symmetric tensor field of second rank)" ^[10]. How so? After all, ds² remains proportional to ℓ^2 , the dimensionality of a surface, in all four-dimensional continua, and adding more dimensions would not change one iota of this fact. The apparent answer is that "such is the definition of Riemannian spaces"...

The gik are functions bound by a specific form of continuous coordinate transformation that determines "a particular kind of gravitational field, a field which can be obtained by transformation of 'field-free' space", and it is by that condition that they are tensor-component functions. Now, let's pause for a bit; what is a space that is 'field-free'? Or a field that is obtained from space, or determined, by a continuous, curvilinear, coordinate transformation of points? Throughout, the "logical simplicity" is achieved only at the cost of treating all and everything as a function of space and space alone, as if space had an ontological or metaphysical existence with respect to which the existence of energy was always secondary ("energy would come to fill space..."). Yet, to read Einstein properly, we should read his intuition behind the language, the lines and the formulas that don't work and seemingly work. His intuition of a 'field-free' space is that of the massfree Aether lattice in a region of abstract space that is substantially devoid of Matter. Just as his intuition of 'a gravitational field that arises from space' can be referred to the double fact that the effect of a gravitational field on Matter is a reaction of the local Aether (lattice), and that the Aether lattice in vacuo, in abstract space substantially devoid of Matter, can be analyzed as if it carried virtual particles of Matter, cosmological elements of Matter, such that it formally and physically permits derivation of a gravitational field there where there is only Aether (we shall see in detail how this is so in the next monograph ^[11]). However, it is never really 'field-free'; the Aether lattice is, in fact, already an energy field, from the start, so to speak (since there is no beginning or end to it). Thus, even manifestation of a gravitational field requires an energy interaction, either internal to the lattice or between elements of Matter and the lattice. Unless one addresses the problems of space and Matter from that energy viewpoint, the approach is bound for failure. Einstein admitted this when he wrote that "the field *cannot* be obtained from the empty space of special relativity by a mere coordinate transformation" [6] (his emphasis). Indeed, it was far simpler and more complicated than he had thought - than a formalistic matter of logico-mathematical simplicity. It was even unclear whether the "infinitesimal displacement field tensor" Γ_{ik} could describe the "most general field". And how could it?, we ask. For the most general field is that of primary massfree energy, and this could not begin being addressed by recourse to tensor functions (yet, it is mildly amusing that the tensor in question, as we remarked

above, could actually be construed to be a 5-dimensional energy tensor, if only Einstein reasoned in terms of energy and not topology).

1.4. What is and is not physics (2):

General Relativity, the scientific method, or lack thereof

When one wonders what went wrong with Einstein's Relativity, the answer encompasses a whole series of steps: time was spatialized and reduced to a timeline by the c constant; addition of coordinates was taken as the essence of a manifold; space was conceived as something anterior to energy, and as the result of a mathematical transition from Gaussian surfaces to Riemannian four-dimensional 'spaces'; energy functions were reduced to a tensor equation. All begins to turn wrong right from the start, when the structure and functions of the gravitational field are made to depend upon the hypothetical structure and functions of the electromagnetic field as postulated by Special Relativity. A ray of light - quid est? Einstein speaks of a spherical disturbance - and then of a ray; what are these, in view of the processes for the dispersion or scatter of energy employed by Matter? Light is not a ray; light, like heat, is energy. It is the result of a complex process of energy conversion - one that our science of Aetherometry has unceasingly detailed: light arises where there is Matter to interact with an electric field and release its acquired kinetic states in the form of photon emission. So, light qua energy process does not travel; the rays are stochastic distributions, scattered or in phase (as in lasers and masers), of photons locally and punctually emitted by decelerating massbound charges. As such, a "field of photons" may have mean distances for the photon-"points" making up the "field", but all these conceptualizations are poorman's versions of the actual, physical energy field - the field that accelerated massbound charges to begin with, that elicited manifestation of their inertial effects, and that ultimately converts their lost kinetic energy into blackbody emission (ie production of photons). That field is a primary massfree energy field, and thus it falls outside of the domain of choice that Einstein gave himself in his gamut of "field-types". Likewise, the field that appears to Einstein to serve the function of a 'field-free' space, is no space in abstract at all, but the field immanent to all physical reality, the real continuum, also a primary massfree energy field; thus the concept of 'field-free' space is nothing other than the recognition, or the representation, of what we call primary latent massfree energy, except that energy is substance but space is not. It follows that the Aether lattice cannot be treated in the way suggested by Einstein, by a symmetrical (or, for that matter, a nonsymmetrical) tensor 'field'.

If Einstein had been right, the problem of physics, and scientific epistemology, would have been displaced from the legitimate and required use of the scientific method and given up its "advantage", only to move towards the mere determination of the "general covariant field" for a "symmetrical [or a nonsymmetrical] field tensor". A topological description could not afford to be bound by the dimensionality of the physical object, precisely what up until then permitted confrontation of theories with empirical evidence. Manifolds could not be restricted by physical dimensionality, or by the mathematical logic of dimensionally-equivalent transformations, nor by the limits of physical functions, by the energy nature of the field processes and interactions; so why bother with all of that? This was the implicit attitude, so detrimental to pioneering science, and so unable to break into the structure of that Aether lattice and reveal its fields, its energy structure, its energy components, its functions, its nodal interlocking of the many physical facets of nature. Thus, if nature really worked the way Einstein's relativistic theories would have it, space would be an abstract substance ("only spacetime is absolute"), the real continuum, describable only topologically and as a Riemannian manifold, and susceptible only to external metrics. Whereas, if the manifold continuum were treated as a continuum of energy, the metric and the transformations would have to be *immanent* to the description and structure of the continuum, not any odd number of additive topological dimensions. If Einstein really knew the energy structure 'of space', then the metric would have made itself apparent to him, and would be obvious from his system of equations. It didn't and it wasn't because he treated the continuum not as an energy continuum, a complex manifold of energy, but as if it were nothing other than the continuity of abstract space, or as if space were a substance and the essence of the physical object. This is an old cartesian error that Spinoza severely criticized. It is the very conceptual root of Einstein's failure to extract a metric system from the structure of energy in its different "field-type" manifestations. It is the reason why there is, and has to be, an ultimate disconnection between the relativistic theory and its empirical confrontation; and it is what forces Einstein, over and over, to retreat into the theoretical primacy of an imaginary connection between topological abstract space, the geometric description of fields, and the 'physical reality' of these fields - a connection he cannot validate. Thus, to the metaphysical assumption that space is substance or has substance is added another metaphysical assumption - that this connection is a given, by reason of yielding constructs endowed with "logical simplicity". In fact, what does Einstein do next, in that 1950 paper? He first presents the theory of a tensor that has the property of symmetry (obeying the condition $g_{ik}=g_{ki}$), a theory which proposes an entire set of differential equations that "completely replace the Newtonian theory of the motion of celestial bodies provided the masses are represented as singularities of the field" ^[6]. He had hoped, he says, that this would have effectively eliminated the notion of "inertial systems". Yet, what did he find? That the symmetric approach could not succeed. And how so? The immediate reason he gives is that an approach which determines the masses to show up only as singularities of the field "indicates that these masses themselves cannot be explained by symmetrical gik fields, or 'gravitational fields' ". To us, qua aetherometrists, this is particularly amusing, in that it is the most direct admission that there is no way to differentiate, by solely topological methods, between the singularities of mass-energy or rest mass, and the singularities of gravitons, or of gravitational 'mass' - which, after all, are the real elements or particles that constitute the gravitational field. No theory of energy, therefore, means no capacity to distinguish between distinct momenta that might be in a phase relationship of superimposition at the same field nodes, such as mass-energy and graviton energy.

It is with disappointment that Einstein honestly acknowledges that the symmetrical tensor approach could not even buttress the Weak Equivalence Principle, that "only *positive* gravitating mass" (Einstein's emphasis) exists. But the real reason the approach failed and was bound to fail is that, in the absence of the symmetry constraint, Einstein had nothing else to go on with: "Evidently, a complete relativistic field theory must be based on a field of more complex nature"; but then he adds - "that is, a generalization of the symmetrical tensor", as if it had not been the inability to hold on to symmetry which had forced him to admit a more complex nature for the total field.

Effectively, Einstein had arrived at the above conclusion by a realization that he takes the trouble to elucidate and we should revisit. Einstein's anticipation is actually a microfunctional one that could perfectly pass for an aetherometric breakthrough: the ideal would have been to derive all the equations for gravitation and electromagnetism from a single variational principle that was described with respect to the total or unitary field. He adds that "this has been achieved", but it was "disturbing to find that it can be achieved in two different ways", which is shorthand for an admission that all one could unify or totalize or integrate (whatever actual physical and mathematical senses are given to these words) was the equations of electromagnetism with respect to the redefinition of the electromagnetic frame (and thus the Special theory), and the relativistic theory of gravitation with respect to the principle of General Relativity. So, instead of one principle of variation, he had two, systems E_1 and E_2 , but no way to extract a third system from their compatibility: "even the condition of compatibility was insufficient to determine the system of equations uniquely". What to us seems peculiar is how Einstein managed to be astonished by this impossibility. Imperfect or defective as Maxwell's and Newton's equations were, they were part of an historical and scientific development of physics that pointed towards its becoming a science of energy, and thus pointed forward towards the energy concept. Einstein, on the other hand, was barring all consideration of Light and gravitation as energy epiphenomena, even while postulating all along that they were epiphenomena of the total field. And if energy only existed in electromagnetic forms, and Matter had to be comprehended solely as a form of electromagnetic energy, then how could a junction between the two sets of physical processes, or the two systems of integration, take place? The separation between the electromagnetic and the gravitational fields could not be bridged, only by fiat. It remained the chasm that would swallow all General and Unitarian field theories.

It is simply astonishing how Einstein, having arrived at this point, makes a proclamation of faith in the logical order of the cosmos in an effort to justify his assumption of "a logical unity" that must prevail over the two distinct principles of variation. This article of faith takes on the very form of a categorical statement: "There exists a third system of equations, E_3 , which is free of the formal defects of the systems E_1 and E_2 and represents a combination of them in the sense that every solu-

tion of E_3 is a solution of E_1 as well as of E_2 . This suggests that E_3 may be the system we have been looking for" ^[6]. Really, what evidence did he have for the existence of this third system of equations other than that he imagined that it should exist and how? A cogent argument for its existence would have required the identification of a new physical characteristic (the discovery of a new form of energy, a new parameter of reference, a new interaction of nature, etc) and just that is what Einstein could not do. Undoubtedly E3 would exist if only he had found it... At stake, indeed, was whether he could reach a formulation that indistinctly produced either the electromagnetic or the gravitational fields. He couldn't and he didn't. The tragedy and the drama was in the failure, the comedy in the way it was reached. Einstein desperately needed a treatment of Space and Time in terms of energy, not topology or geometry. He needed to understand and accept how the logic of the quantum applied to light, heat and the electromagnetic transformations of Matter, but not to its electrical structure or the electrical structure of the fields that communicated the condition for the expression of electromagnetic fields. E₁ and E₂ appeared incompatible only because he could not bridge the "formlessness" or "multiple form-ness" of physical reality; neither from a constraint of symmetry between different (sub)principles of variation, nor from one of compatibility between them. He had, in fact, to go back to those systems of equations he wanted to revise and improve, Maxwellian and Newtonian, and find their phenomenological unity in terms of energy and the different metrics that are immanent to distinct 'field-types'. So, if Einstein arrived at two irreducible principles - and correctly did not want to accept that General Relativity should only apply to one of them, ie the gravitational field, while Special Relativity remained the domain of the other - all he had to do was go back to each (sub)principle of variation and figure out what did not jibe. That, he didn't do - exactly because he had no notion of the energy structure of that 'total and unitary field', nor even an accurate physical notion of its (massfree) nature; thus, for all effects and purposes, he was obliged to avoid a deep physical probing of those fields, their nature and their immanent laws. For these two principles appeared to be like two sets or families of curves, some straight and others curved, where never the twain shall meet; yet, the reality is that there are no straight lines anywhere in nature, not even for rays of light, and the two systems are just two systems of curved lines, two different but related wave systems, each with its own fine structure constraints.

Moreover, if nothing else, Einstein could have begun by remarking that there can not be, nor should there be, a concept of field which 'here' means a frequency (as is the case for an electric field), 'there' a reciprocal of length or a density of (wave)lines (as is the case for the magnetic field) and, just to make sure that one is being 'pluralistic', still over there, in the case of the gravitational field, means yet something else, an acceleration, for good measure. It is an inconsistent concept, and only inconsistent and erroneous notions can result from inconsistent concepts. Einstein, funnily enough, somehow knew that if he had opted to conciliate his theory with quantum mechanics, the problem would have had a similar issue - since, indeed, as Aetherometry demonstrates, the physical logic of the interactions of primary massfree energy do not obey the metrics that underlie the logic of Planck's quantum; even massfree charges do not fit the quantum constant when it comes to their fine structure. So, understanding the two systems in terms of energy was the only eye-of-the-needle that Einstein could have gone through to find a solution. We have battled over this issue before - and the limitations of the General Relativity theory and its theory of gravitation; yet, the real limitation to Einstein's thought came, not from his discarding or relativizing the use of the scientific method, but from a much more basic error and, at that, an error of primary logic. If E_3 were everything Einstein billed it as, then it should not have been from the symmetry, compatibility or confrontation of E_1 and E_2 that the solution of the total field E_3 , or the ultimate energy system, should have come; just the other way around, it would have been from actually identifying E_3 that the solutions to E_1 and E_2 , plus their subvariational principles, should have derived. Had Einstein shown just this, how this is, or could be, done, he would have found an apt description of the 'total field'. Even his attempts at a unitary field never really considered anisotropic distributions of energy in that third system, at best only the possibility of there being a preferred direction to space.

Perhaps it was the wrong choice of method or 'logical' approach to linking electromagnetism and gravitation that, at the end of the day, doomed Einstein's efforts. His reduction of the value of the scientific method down to a mere "advantage" was, in his mind, totally justified by a deeper reason, a reason that made him doubt the primacy of experimental over theoretical science: "No amount of collection of facts could lead to these equations [for the total field] unless the principle of general relativity were used. This is the reason why all attempts to obtain a deeper knowledge of the foundations of physics seem doomed unless the basic concepts are in accordance with general relativity from the beginning" ^[6]. It was this deeper reason "that forces us to apply free speculation". Now, while it is obvious that no amount of collected facts can produce a single equation, it is apparent how Einstein seemingly misunderstood the scientific method: it does not reduce to collection of facts, it is not merely experimental, as if it were an haphazard activity guided by curiosity and rather headless, or unable to think and articulate facts. Undoubtedly there have always been dilettante experimentalists who often did not even realize what they had struck upon - and some have been of use to science - but the scientific method is all about the testing and the conditions for testing of an hypothesis that pre-exists the experimental series. The inductive role of the empirical confrontation with the facts only exists, and can only become systematic and productive, if there is a context provided by a systematic hypothesis, by a theory. So, the entire scientific question such as it applies to Einstein's problem is not whether the confused and disordered state of basic concepts that "are comparatively 'close to experience' (eg the concepts of force, pressure, mass)" must be set according to GR, but whether these basic concepts (field included!!), once they are made consistent, conceptually and operationally (hence legitimate vs illegitimate uses of mathematics in physics), will still be susceptible of being in accord with GR. Aetherometry shows they aren't, nor will be. Without a grounding in basic science, without the grounding of basic science in basic concepts and their experimentally verified physical functions, free speculation becomes idle. Thus, when Einstein could no longer employ Riemann's symmetry criterion, and attempted a "nonsymmetrical" theory of the total field - his last attempt - again he fails, because "the transformation law of the symmetrical part of the field alone does not involve the components of the antisymmetrical part or *vice versa*" ^[6]. It was the energy irreducibility of mass-energy and its phase graviton energy that had become impassable for an approach not based on energy and, moreover, not based upon an understanding of massfree energy with its properties of superimposition. Indeed, the "initial condition", or, more properly, the "field of a more complex nature", could not be freely or arbitrarily chosen; it was a matter of physics and not mathematical logic, even if it was bound to impact the latter. Unable to clinch his case, symmetric or not, for the total field, Einstein conceded rather lamely that perhaps it had all been in vain: "You are right, dear skeptic. Experience alone can decide on truth" ^[6]. And all he was left with was that GR may yet generate testable predictions: "The derivation, from the equations, of conclusions which can be confronted with experience will require painstaking efforts and probably new mathematical methods" ^[6], the last lines of that 1950 paper.

There is experimentation in theoretical science (so-called pure sciences), as there is in experimental science - and neither should be less systematic than the other. What there cannot be is a science (1) whose experimentation is only theoretical, and (2) whose experimental science is incapable of inducing that theoretical experimentation in the "right direction", and thus exists only in the capacity of an applied science . Because, at the end of the day, the real experiment in thought and scientific knowledge is the synthesis and confrontation of the experimentation in theory with the experimental scientific method that produces the empirical facts and is capable of guiding the theory forward. Science, real science, is neither pure nor applied; it is experimental in this very sense we have just enunciated. So what, at the end of the day, did Einstein need? Perhaps knowing the energy structure of the electron would have sufficed to destroy the persistence of cartesian metaphysics, but what he needed, and desperately so, was a "purely algebraic theory" of energy ^[12], along with the experimental data on which to base it. What's fascinating about Einstein is that he acknowledged the first half of what he was missing in his very last writing (see note ^[3]). That alone makes him a scientist, unlike the relativists that followed in his steps. Yet, acknowledging failure and anticipating at least part of the way out, is a long way from actually understanding that energy comes in two species, massbound and massfree, and finding their concrete common principle of variation. After all, there is a unitarian field, but to grasp it would have required Einstein to understand what the Aether is and is not. He only understood, and partially so, what the Aether is not.

1.5. Einstein's General Theory of Gravitation

Returning, then, to Einstein's treatment of the formal equivalence between inertial and gravitational systems in the context of his topological approach, the simplest transformation of the 'straight line' in Riemannian theory being that of the geodesic line, Einstein proposes a tensor expression for the gravitational field components:

$$\Gamma^{\mu}{}_{\alpha B} \left(dx_{\alpha}/ds \right) \left(dx_{B}/ds \right) \tag{577}$$

which he defines as equal to the geodesic line built by successive elements undergoing parallel displacements in the pseudo-Riemannian 4-dimensional manifold, and thus functionally equivalent to the straight line of inertial systems:

$$d^{2}x_{\mu}/ds^{2} = \Gamma^{\mu}_{\alpha B} (dx_{\alpha}/ds) (dx_{B}/ds)$$
(578)

When written as

$$(d^{2}x_{u}/ds^{2}) + [\Gamma^{\mu}_{\alpha B} (dx_{\alpha}/ds) (dx_{B}/ds)] = 0$$
(579)

the equation embodies the principle of equivalence between inertial and gravitational fields, and this expression reduces to a straight line (in a flat 4D pseudo-Euclidean Spacetime) when the tensor expression, or the gravitational field that defines it, vanish.

It is clear from Einstein's general notion of a unified field theory (UFT) - or a theory of the total field - and its 'geometricizing' treatment of GR, that there is no room for any concept of antigravity in either one (GR or UFT). No opposing inertial or gravitational mass signs exist, so antigravitation is an impossibility ^[13]. Being imagined to propagate at the speed of light, gravitation is a constant, imperceptibly changing with time (decreasing in value as the aging universe progressively expands; but what expands, in Relativity, is the vacuum in the interstices between matter, as the atoms *will* gain mass, contract, and so will the sizes of the orbits of electrons and nucleons within the atom ^[14]). Development attempts at a UFT led Einstein to postulate a complex system of tensors where the energy density of the electromagnetic field, including its main component - "the energy of ponderable matter" - is taken into account together with the "energy density of the gravitational field, so that there can be no talk of principles of conservation of energy and momentum for matter alone" ^[15].

In this account, the gravitational field transfers therefore both energy and momentum to the electromagnetic field, and thus to Matter, with the characteristic of the gravitational potential being, not that of a scalar - as in Newtonian theory - but that of a tensor. If, on the other hand, one makes

- as Einstein effectively did - the argument that everywhere 'in the cosmos' there are gravitational fields, the principle of equivalence between inertial and gravitational systems is in effect a *denial* of the universal existence of inertial frames of reference: "[Einstein] came to recognize that the concept of the infinitely extensible inertial frame of reference might have to be abandoned in favor of the local free-falling frame of reference", even if the latter, as a local manifestation, was always nonextensible ^[16].

Einstein's UFT was *de facto* and *de jure* incomplete - Einstein could not really decide between a quasi-Euclidean universe with an infinite radius of curvature and thus an infinite space, and a spacebounded or closed universe. Moreover, since, in either case, Time was always and already spatialized, the quasi-Euclidean universe would imply an infinite Time just as the closed universe required a finite Time. This is why the legacy of his UFT is a function for G which constitutes, strictly speaking, an effective undecidability:

$$G = \pi a c^2 / 2M \tag{580}$$

where M is the total mass of the Matter in the universe, and a the radius of the universe. Since we cannot know either one (the mass of Matter will not be conserved, but increase, and it is unknown by how much; and we shall not even be sure that the radius is conserved, or exists as such), the 'function' is merely hypothetical, and axiomatic by postulation. We note, however, that in this postulated function, the dimensionality is correct and confirmatory of the aetherometric dimensionality of G: it suffices to convert the mass M into its equivalent wavelength, for G to reduce to "length squared over time squared", the aetherometric dimensionality. If the universe were closed, Einstein would concede that E. Mach ought to have been correct - and inertia, as well as gravitation, depended upon the mutual action between bodies or their masses, no matter how distant. The physical properties of space would be, not independent from Matter, but conditioned by it ^[17], and this would lead towards an epistemologically "more satisfying" model where "the mechanical properties of space [were] completely determined by the properties of matter" ^[18]. In a quasi-Euclidean universe, one would have to conclude that inertia would depend in part upon the mutual interactions between bodies, and in part "upon an independent property of space" ^[18]. It is important to remark, in this context, that the massfree Aether is precisely such an independent property, except not of space, but of energy - of energy devoid of mass, of energy that cannot be reduced to Matter ^[19]. Further, Einstein is thereby laying the foundation for the argument that both inertia and gravitation are not solely determined by Matter. Yet, the reader needs to keep in mind that this independent property, in Einstein's language, meant solely a formal property of geometry or of 'space taken in abstract'.

1.6. What is and is not (meta)physics (3):

How relativistic UFTs are doomed to fail

Einstein's frame of mind - viz. his mixed mechanistic and mystical inclinations, his aesthetical attraction to formal 'solutions', his repulsion of probabilistic approaches, etc - is not foreign to the solutions he proposed, or to the solutions he *failed* to propose, given the failure of all of his UFT attempts: "I believe that every true theorist is a kind of tamed metaphysicist, no matter how pure a 'positivist' he may fancy himself" ^[6]. Eventually, Einstein attributes to 'the tamed metaphysicist' the notion that "all sensory experience can be 'comprehended' on the basis of a conceptual system built on premises of great simplicity" ^[6]. But whereas there is some truth to having to be a tamed metaphysician when it comes to enunciating the logical hypotheses behind conceptual systems, it seems to us that what makes science into science is its call upon an experience that no logical apriorism can anticipate, and which yet deploys its own 'material', 'experiential' (sub poena of tautology), 'energetic' logic. It is just this logic that one does not know - or, more properly, that Einstein did not know. And so it happens that in the very logic of nature there is no compelling reason - to this day - to accept any or all of the logical (logico-mathematical) distortions that Einstein grouped under the rubric of Relativity. Where is the proof that rods contract longitudinally but not transversely? Surely that is not the only possible physical meaning of Kaufmann's 1905 and Bucherer's 1909 experiments. And so on.

Einstein, in fact, was well aware that experience cannot be inferred from logic. He states that theory "cannot arise apart from and independent of experience" [6]. So, he obviously felt that the logic of Relativity was best suited to extract the logic of experience. We have, in several other publications, shown how, in a phenomenological sense, Einstein could be justified in holding such a view. But he must not have searched too hard under the surface of 'things'. Thus, for instance, when Einstein thinks about 'field' he returns unquestioningly to Maxwell's differential equations for electric and magnetic fields, which suggested the existence of electromagnetic waves whose properties explained those very fields. But he never realized how Maxwell's equations only described secondary or tertiary phenomena, the electromagnetic derivatives, and all ascription of the primary phenomena remained as nothing other than a logical inference - at that, a totally erroneous one, since it confused the production of light (photon) with the propagation of its trigger (massfree electric radiation), and ignored entirely the field interaction with massbound charges that is physically required to express any blackbody photon. After all, the field responsible for the electric and magnetic manifestations of massbound charge is not primarily electromagnetic, but ambipolar. Einstein was sorely aware of this problem, even as he knew nothing about the nature of ambipolar radiation. Here is what he wrote as he attempted to think the field - assumed to be electromagnetic - as a physical element distinct from Matter: "Now a question arose: since the field exists even in a vacuum, should one conceive of the field as a state of a "carrier", or should it rather be endowed with an independent existence not

reducible to anything else? In other words, is there an 'ether' which carries the field (the ether being considered [to be] in the undulatory state, for example, [as] when it carries light waves?" ^[6]

Einstein intuits the physical nonsense of a field that is energy-less and yet said to be independent of Matter (the continuum would have to be a pure but rigid form, parallel to the platonic Idea). He senses the field must have a carrier (an "ether"). But if there is a carrier, it is only qua electromagnetic carrier that he can imagine it, even as late as 1950. Thus we call the attention of the reader to the intrinsic limitation of this thought: if photons are byproducts of the interaction of massbound charges, as Aetherometry claims they are and for which it has provided the exact equations, then the electromagnetic field is secondary to the kinetic energy interaction of the massbound charges; moreover, if the kinetic energy interaction is - as Einstein wanted and as Aetherometry concurs - second to the action of the field upon those charges, then the field acting upon those charges is surely not the electromagnetic field that results from their interaction. It is as if Einstein had remained stubbornly married to an incapacity to distinguish between the accelerating massfree ambipolar field, the kinetic interaction between the accelerated massbound charges, and the resulting tertiary electromagnetic field. Thus, he condemned himself to miss the relation between the primary electric field and the derived electromagnetic field(s) ^[20]. There could be a carrier (or Aether) to the primary field, and it did not have to be electromagnetic, nor carry electromagnetic waves. This was the omission or mistake to which logic led Einstein, and for which there is, to this day, not a single shred of justification. Yes, no electromagnetic carrier exists or needs to exist; no, every accelerating field does require a carrier, just not an electromagnetic one.

Yet, Einstein was keenly aware of the intrinsic limitations of Maxwell's theory: "the introduction of the field as an elementary concept gave rise to an inconsistency of the theory as a whole. Maxwell's theory, although adequately describing the behavior of electrically charged particles in their interaction with one another, does not explain the behavior of electrical densities, *i.e.*, it does not provide a theory of the particles themselves. They must therefore be treated as mass points on the basis of the old theory. The combination of the idea of a continuous field with that of material points discontinuous in space appears inconsistent. A consistent field theory requires continuity of all elements of the theory, not only in time but also in space and in all points of space. Hence the material particle has no place as a fundamental concept in a field theory. Thus even apart from the fact that gravitation is not included, Maxwell's electrodynamics cannot be considered a complete theory" [6]. We have elsewhere ^[21] pointed out the confusion between electromagnetic field and electric field, and how damaging that has been, for over a century, to physics. Thus, evidently, Maxwell's field equations failed to account for the field energy densities, as they failed to account for the internal energy structures of material particles (mass points became a refuge) - the carriers of massbound charges and as they failed to account for the whole interaction whereby the electrical field accelerates those massbound charges. Moreover, as we have equally shown, theoretically and experimentally ^[22], the primary electric field is a massfree one and has to be distinguished from the "distortions" imposed by the superimposed motion of the accelerated massbound charges (collectively forming the secondary electric field(s)) and their elastic and inelastic collisions, the electromagnetic field coming a distant third when, and only when, those massbound charges finally lose their kinetic energy. Lastly, in this respect, the continuity that Einstein sought for all physical phenomena can only be provided, indeed, by freely superimposable massfree energy - an Aether "carrier" that constantly involves energy flux or displacement and is thus the source of primary fields. There is no continuity (let alone one that applies to the gravitational field) that can be reached by transforming timelines into spacelines through the intermediacy of an invariant light speed - if for no other reason than because electric and gravitational fields are not ruled or measured by light pencils.

It's fascinating to follow that 1950 paper of Einstein's on a Generalized Theory of Gravitation. While, on one hand, when he thinks of a carrier he can only conceive of it as a carrier of electromagnetic waves or of the electromagnetic field (and this, he discards), on the other hand, he draws the reader's attention to the possibility that gravitation might be "considered as a 'field' " ^[6]. He specifically presents this as a necessary complement of the principle of equivalence (see above) and states: "This interpretation implies that A is an 'inertial system', even though it is accelerated with respect to another inertial system"; and then he adds in parentheses - "It is essential for this argument that the introduction of independent gravitational fields is considered justified even though no masses generating the field are defined; therefore, to Newton such an argument would not have appeared convincing" ^[6]. Indeed it would not, as gravitation in the absence of mass or interacting masses would have seemed physically meaningless to Newton (who, to boot, had no concept of energy). Moreover, to speak of 'accelerated' 'inertial systems', as Einstein acknowledges, is already a conceptual perversion, a paradoxical language. Let's assume that Einstein is correct, and that we should think the gravitational field independent of mass or interacting masses: would the gravitational field then not also require a carrier, a gravitational Aether? And if independent of mass or of the interaction of masses, should it then not be understood as a massfree field?

Einstein's answer to both questions is not 'yes', as we have also pointed out before ^[2, 19]. Rather, it is here, at this junction, that his approach entirely reduces to metaphysics. He presents it in different terms, of course, claiming that he is in pursuit of the physical content of that 'gravitational field'. For what he takes from the notion of 'accelerated inertial systems' is that the equivalence of inertia and gravitational mass requires every inter-system transformation of (the four) coordinates to become non-linear. So when he looks for the physical content of the gravitational interaction, it is not in massfree energy that he finds it, but in space, in the relativistic-geometric concept of space to be exact, since this space already is deemed to demand those nonlinear transformations: "According to general relativity, the concept of space detached from any physical content does not exist. The physical reality of space is represented by a field whose components are continuous functions of four independent variables - the coordinates of space and time. It is just this particular kind of dependence that expresses the spatial character of physical reality. Since the theory of general relativity implies the representation of physical reality by a continuous field, the concept of particles or material points cannot play a fundamental part, nor can the concept of motion." One might be tempted to say that, until Einstein came along, and by Einstein's own definition of 'space', no one really knew what they meant by 'space'; indeed, Einstein's 'space' is not susceptible of being grasped by any senseperception...

Elsewhere ^[23-25] we have presented evidence for an alternative physico-mathematical approach to nature or physical reality. There, space is not the effect of the representation of a field, but a function of energy, a direct property of energy. The continuity does not reside in the continuous analytical transformation of coordinates, but in the energy continuity of wave functions and in the energy-and-wave properties of superimposition. The continuum is not four-dimensional, nor is time spatialized into a fourth dimension of space; rather, the continuum is one of energy, and a fivedimensional synthesis of distinct manifolds - the three-dimensional (not Euclidean) manifold of Space, and the two-dimensional manifold of Time. We have shown how Einstein was wrong in supposing that space acts on objects, but not objects on space - as if space, a topological and abstract space, had a metaphysical substantival nature. That is just what Aetherometry views as being at the antipodes of finding "the physical reality of gravitational fields". If space acts on objects, so do objects act on space. In fact, as claimed by our theory, space and objects are not exactly comparable entities that can enter into relation. Objects are always assemblages of energy - systems of energy or systems of Matter or mass-energy. Whereas Space and Time are not assemblages of energy, they are not energy systems; this is already the grand confusion of so many poor physicists who get lost in metaphysics. Space and Time are manifolds, the properties of energy - and Matter or mass-energy comports its own Space and Time continua; as does the Aether, or massfree energy, which comports a single continuum. Every energy unit is already a synthesis of Space and Time. Furthermore, in what concerns the Aether as massfree energy - the 'real' or physical carrier of electric and gravitational fields that Einstein refused to consider - the property of superimposition of energy (phase energy superimposition) does not physically permit any such topological approach to space as that which Einstein proposed and only too logically derived. Leibniz indeed was correct in this (and not Newton or Einstein either) -Space is merely a property of "things", if by "things" we cease to mean only "material objects", but now mean "energy systems", whether material or massfree. Space is not a property of Matter, anymore than it is a geometric property, an empty mathematical envelope that Matter must comply with by some metaphysical and arbitrary compulsion. Space is a property of energy, intrinsic to all energy, including mass-energy. The abstract space that our senses are taught to perceive is in fact nothing other than the myriad superimpositions of the Space functions of massfree energy, the superimposition of all the volumes of a myriad monads; it is a seamlessly continuous, vortical and ordered 'resultant space', such that the primary ambipolar and gravitational fields are already conveyed as elements of the energy continuum. Instead of plunging into the intrinsic nature of those material particles that remained opaque by being reduced to imaginary point masses, Einstein rationalized his avoidance. Instead of understanding those material points as energy 'structures', he ignored them. Instead of seeking to resolve the real motions or wave functions responsible for the fields (including the electromagnetic field), for their standing and propagation, Einstein discarded the concept of motion - it was not wanted, when what was sought was only to create a quasi-static topological structure that represents 'the' four-dimensional Spacetime.

It would have sufficed - as Einstein knew and once stated as being of paramount importance - to actually solve the internal structure of the electron, for all of this abstract geometrization of nature to become futile. As we have pointed out, even the last lines Einstein wrote regarding his inability to come up with an algebraic theory of physics show that he sensed this very fact. Furthermore, his disbelief in quantum mechanics had everything to do with his suspicion that particle physics would never be able to crack the intrinsic structure of the "field singularities", not even the subquantic or fine structure of the electron. There, in the internal wavefunctions of the electron mass-energy, it becomes apparent how nature couples manifolds and creates separate energy continua for discrete or particulate manifestations of energy. It further becomes apparent how the structure of the electron is in direct balance with its gravitons, and in phase balance with superimposed Aether energy units ^[26]. It was necessary, after all, to understand the nature of material particles, and also how precisely it is that they move; just as it was necessary to understand that massfree energy also presents particulate behaviour, that there are nonmaterial, massfree particles, and what their wave structures are. Einstein missed all of this - and so, when it comes to a generalized theory of gravitation, he failed to realize that it had to grasp the field as the effect or property of a flux of massfree energy - in order to understand its states of motion, its wave functions, its self-referential Space and Time manifolds, its relationships of superimposition. General Relativity failed to grasp all of these, replacing the dynamics of nature with a content that turns out not to be physical; neither physical nor energetic, but metaphysical.

At this point we must consider the subsequent fate of Relativity as shaped by de-ranged (meta)physicists, the whims of peer-based academic institutions, the corporate and military requirements for research and support, and the media dictate of changing fads that justify the ample spending, from the public purse, to maintain scientific priesthoods and the domination of scientifically incorrect models and theories. We fail to see, to this day, the value in examining the metaphysically abstruse notions of Hawking's or Wheeler's, such as black holes, white holes and the wormholes connecting them ^[27], Big Bangs and Big Crunches, or the supposed 'equivalence' G = c. That's not to say that there is not a body of "dark energy" in the center of our galactic core, for instance - rather, that such a dark body does not make plausible the neo-relativistic concept of black holes, since this

concept has specific theoretical implications that are not supported by actual physical evidence, least of which coming from that galactic center. Thus, either by distorting the empirical facts, or by replacing the latter with imaginary mathematical elucubrations, these post-Einstein developments of relativity - which, in our view, cannot be taken seriously - they the extent to which official, academic science has been reduced to high-flying metaphysics or what Nietzsche described as "sterling mediocrity grown even more mediocre" ^[28]. Equally, they betray the impotence of existing epistemological methods to explain and comprehend the basic functions of nature, the continuity of nature that underlies all particulate behavior. These are not physicists, but tailors - the fashion-designers of "the universally admired 'popularization' of science, that is to say, the infamous trimming of the coat of science to fit the body of the 'general public' - to employ a cutting expression for an activity suited to tailors" ^[28]. There are too many second-rate tailors for us to bother with them or their emulators.

1.7. Aetherometric criticism of GR with respect to gravitation:

The total field, the 'ZPE' and the cosmological function G.

There is little that Aetherometry shares with Relativity, given that Aetherometry openly rejects any and all geometric operations of distortion of length and time measures (no Lorentz transformations), and thereby, as well, any form of spatialization of Time, whether with flat or with curved 4-D so-called 'continua'. It is equally obvious that Aetherometry has no need to amalgamate inertia and gravitation the way Mach and Einstein were forced to do. Gravitation is not a mere metric of a 'space' to be filled with an electromagnetic field, anymore than the latter lacks a metric of its own Space-and-Time properties or functions. Space and Time, or Space and Simultaneity, are shown aetherometrically to be but energy properties - no matter whether we are considering massfree or massbound energies or energy forms (types or manifestations - mechanical, electric, thermal, etc). The confusion about inertia is endemic to all physical theories - since inertia is employed, here, as the mere equivalent of mass, there, as a resistance to changes in motion, and still somewhere else, as a force that resists those changes; and, if this did not make it useless enough as a concept, with respect to rotation it acquires yet another meaning or physical sense which, aetherometrically, gives a volume or Space function (see ^[29]). This pervasive inconsistency - or total lack of logical economy, as Einstein might put it - makes risible any amalgamation of inertia to gravitation. Just what is inertia? If physics is unsure both about what is inertia and what is gravitation, how can it establish the functional equivalence between inertial and gravitational mass(es)? Einstein, in fact desperately needed an understanding of what exactly is inertial mass - what is its intrinsic energy, its geometric structure, its wave functions, its mass-equivalent wavelength. Only then could he have begun to discern how 'gravitational mass' is called 'mass' because of a physical coincidence of energy (eg superimposition of electron with its graviton(s)) and a wavelength resonance in that coincidence, so that the real equivalence - in the case of the electron, for example, is the equivalence which physically exists between the inertial mass of the electron *and* the gravitational wavelength of the massfree graviton. All this was missed.

If Relativity had not spatialized Time and precluded thereby any conceptualization of Simultaneity as wave synchronization - as that which permits the very existence of energy through the primary superimposition of waves - then the conclusions regarding the nature of the universe would not be reducible to the options Einstein glibly provided. Aetherometric theory teaches, in this respect, that the total energy of the universe can be finite, and the Space produced by that energy equally finite, and yet the universe be effectively infinite with respect to the diachronicity of Time, and the total Space of energy, plus the effective abstract volume that it occupies, constantly changing variables. Einstein's argument is merely a geometrical one - but there are no flat or curved Spacetimes, only a finite globular Space - the fruit of the phase-energy superimposition of countless monadic Space functions - and an infinite, universal Time that does not prescind of Simultaneity or energy synchronism.

Moreover, and like Einstein in this respect, aetherometric theory considers that neither gravitation nor inertia are properties determined solely, or even mainly, by the mutual interactions of the bodies or masses in the universe per se. Here is a very condensed account of the aetherometric approach to the problem of equivalence between inertial mass and gravitational "mass". The zero sum relation between the two can only be expressed paradoxically. For example, for the electron: given that the so-called gravitational "mass" is not a mass but a wavelength function of the graviton (of the electron-graviton, to be precise), we can write what appears to be a paradox:

$$m_e - \lambda_e = 0 \tag{581}$$

The conundrum can only be resolved non-paradoxically by the mass to length transformation, $m_e = \int = \lambda_e$ (for an exact quantitative and physical treatment see ^[30]) - not by any Lorentz transformation. Thus, the general proposition:

only has physical meaning because both masses can be treated as wavelengths:

$$\lambda_{e} - \lambda_{e} = 0 \tag{583}$$

In the case of inertial mass, this is the composite wavelength of the mass-energy torus of the electron, and in the case of gravitational 'mass' it is directly the wavelength of the graviton, ie of the massfree energy unit that superimposes with, and acts upon (directionally impels), the electron, in such a man-

ner as to create the gravitational field. If we now wanted to generalize that relationship to include the Space and Time manifolds of the electron mass-energy (treated by its electromagnetic equivalent, as $m_e c^2$) and the graviton massfree energy (aetherometrically given by $\lambda_e W_{Ge}^2$), we would get non-sense, given that physically:

$$(m_e c^2) - (\lambda_e W_{Ge}^2) \neq 0$$
(584)

The reader may now begin to understand why it matters indeed to know just what is the energy configuration of particles, whether material or massfree. This is further underlined by the aetherometric discovery of the basic subquantic structure of the electron mass-energy, which is not given by its electromagnetic equivalent, but is, instead, electric, or electric *and* magnetic (not photon-like). In an article we wrote for the *Encyclopedia Nomadica* ^[31] on the Photon, we summarized the fundamental structure of the electron mass-energy by an exact master equation:

$$E_{\delta e} = \lambda_e c^2 = p_e W_x = \lambda_e W_k W_x$$
(585)

where λ_e is the mass-equivalent wavelength, the product $p_e W_x$ is the energy of the electron massenergy (equivalent to 511keV), p_e is the elementary charge of the electron expressed in meters squared per second, W_x is the voltage-equivalent wave speed in meters per second, and W_k the magnetic wave speed internal to the charge function of the electron. Physically, this means that the structure of an electron is finite (has volume, temporal and undulatory characteristics), and that it is an electric structure. A short demonstration and formal proof of this assertion is that the same mass-energy can be written with reference to the elementary electrical charge q, such that an exact conversion equivalence results:

$$E_{\delta e} = \lambda_e W_k W_x = j = q V$$
(586)

"For inertial purposes, or with respect to the electromagnetic frame (or any such frame), this electrical structure is 'seen' as having the inertial property described by $\lambda_e c^2 = m_e c^2$. And likewise, whenever this rest energy is effectively transformed into an ionizing photon (by impact, to generate the limit X-ray corresponding to the Compton electron wavelength, as in production of photoelectrons, or by pair-annihilation, to generate a gamma-ray), the electrical structure of that electron is dissolved, and its inertial or rest energy equivalent becomes effectively transformed into electromagnetic energy in conformity to the real conversion given by $m_e c^2 = h v$. This also serves as a demonstration that the 'rest' energy frame of a particle or a body is also its electromagnetic frame." [31]

If we now wish to express these relations with respect to the Space (S_n) and Time (Γ_n) man-

ifolds that are intrinsic to the inertial and gravitational energy units that enter into relation, we must make explicit the Space-constituent wavelengths and Time-constituent frequencies of that electric structure, and do likewise for its superimposed graviton. The result for the *electrical* fine structure of the 1s¹ state of the electron mass-energy, as previously published ^[29, 32], is

$$E_{\delta e} = S_{\delta e1} \Gamma_{\delta e1} = (\lambda_e \lambda_h \lambda_x) (\upsilon_k \upsilon_{\delta e})$$
(356)

It is easy to extract from this the rotary inertia I intrinsic to the electron mass-energy, and directly express it in terms of the traditional Bohr radius ^[29]:

$$I_{e1} = \lambda_e \,\lambda_h \,\lambda_x = \lambda_e \,r_B^2 \tag{357}$$

We have also identified the alteration of the Space manifold that complies with the energy fine structure of the purely electromagnetic state ^[29]:

$$E_{\delta e} = S_{\delta e 2} \Gamma_{\delta e 2} = (\lambda_e \lambda_q \lambda_{ce}) (\upsilon_k \upsilon_{\delta e})$$
(358)

and showed how the rotary inertia is conserved:

$$I_{e2} = \lambda_e \,\lambda_q \,\lambda_{ce} = \lambda_e \,r_B^2 = I_{e1} \tag{359}$$

A similar aetherometric treatment of the electron-graviton unit of massfree energy ^[30] yields:

$$E_{Ge} = S_{Ge} \Gamma_{Ge} = \lambda_e^3 f_e^2 = \lambda_e W_{Ge}^2$$
(213)

showing the homogenous nature of the gravitational Space function (λ_e^3), or of the rotary inertia *of* the electron-graviton. It is apparent from the preceding that the *simplest* definition of a continuum is that which applies to the composition of every energy-unit: it forms a continuum of energy by virtue of a dual superimposition (or synthesis) of manifolds and of elements within each manifold:

$$E^{1} = S^{1} \Gamma^{1} = \ell_{1} * \ell_{2} * \ell_{3} * t_{1}^{-1} * t_{2}^{-1} = x^{3} t^{-2}$$
(497)

Defined in this way, a continuum always possesses five dimensions - three in Space and two in Time - and is at once energetic and a continuum of Space and Time (resonant simultaneity and diachronicity). How, then, do the Space and Time manifolds of the electron-graviton relate to the Space and Time manifolds of the electron mass-energy? In other words, what is the *complex* concept of an energy continuum?

To answer that question we must return to one other physical meaning of inertia. This is the sense which, in particular, the work of Harold Aspden has explored: whether for linear uniform motion or for accelerated angular motion, inertia here designates the property of conservation of the intrinsic energy of a body or particle of mass under acceleration. Since masses are associated with energy in the electromagnetic field, and this field is essentially composed, as Einstein puts it, by "the energy of ponderable matter" (its main component) and electromagnetic energy (photon component), it is the entire 'electromagnetic field' that is photoinertial - precisely because its components or their equivalents, whether they are photons, or massbound particles, are everywhere ruled by the invariant c (and their energy by c²). More profoundly still, when (inertially) accelerated, particles of Matter acquire kinetic energy, but regulate such acquisition from the accelerating field, not by radiating that energy electromagnetically while accelerating (a conventional myth that is too rarely questioned), but by resisting that acquisition all the more as the field energy, and thus the acquired velocity relative to the local photoinertial rest frame, are high. Effectively, as we have suggested elsewhere ^[29, 33], every particle of Matter increasingly resists acquisition of kinetic energy as the magnitude of this kinetic energy approaches the magnitude of the mass-energy of the particle. This suggestion has permitted us to understand the 1905 Kaufmann and 1909 Bucherer results, and what is referred to as "increase in electromagnetic mass with relativistic velocity", in a very different manner - no such mass-increase exists, nor can it exist if massbound charge is to be conserved (which it is); the resistance to field acceleration is entirely due to the modulation of the magnetic wavespeed that is intrinsic to charge. Lastly, it is only when particles of Matter decelerate that they produce ('radiate') blackbody photons from the kinetic energy they discharge.

The preceding paragraph describes the situation of moving particles of Matter with respect to the photoinertial frame. This situation raises, in fact, what we like to call the problem of "inertial motion", or motion characterized by resistance of inertial mass to the accelerating field. If all field acceleration induces such motion (ie has inertial characteristics), then the lightspeed c presents indeed an absolute photoinertial limit to the speed of material particles or bodies.

But do material particles only respond to field acceleration in this manner? To answer this, we must answer the previous question concerning the relation between the electron mass-energy and the attendant graviton massfree energy. We have already shown how gravitational 'mass' does not refer to 'mass' per se (all mass is inertial, in fact) but to the mass-resonant wavelength of a massfree energy unit, the electron-graviton. Gravitation is no mere metric, but has its own metric not reducible to that of the photoinertial frame. It is the electron-graviton that defines the gravitational frame, and this energy is seated on a massfree particle which is synchronized in Phase Space and Phase Time with the mass-energy it affects (or to which it is "anchored", to use Aspden's term; see below). The wavespeeds of these gravitons, W_G , are distinct from c and rather slow.

These two energy frames - photoinertial and gravitational - are mutually irreducible but also exist only in a relationship of secondary (or phase) superimposition, and thus continuity. Underlying the gravitational interaction, there is a special electrodynamic interaction that is itself subtended by the cosmological creation of Matter and associated gravitational fields from the superimposition of nonelectric massfree aether energy ^[34]. In other words, both the inertial (E₁) and gravitational (E₂) frames are subordinate to a third frame, the "total field E₃" or their genealogical principle defined by the superimposition of massfree energy. It was directly from the analysis of the microwave CBR that we were led to discover the general principles of cosmological creation ^[26], which we will summarize now. Graviton energy E_G and mass-energy E_{δ} exist in a relation of secondary (or phase-energy) superimposition with each other and the cosmic massfree nonelectric Aether E_{α} ; for light leptons (electrons) we have:

$$E_{\alpha e}^{2} = E_{\delta e} E_{Ge}$$
(223)

where:

$$E_{\delta e} E_{Ge} = (m_e c^2) (\lambda_e^3 f_e^2) = (m_e c^2) (\lambda_e W_{Ge}^2)$$
(224)

Cosmologically, the asymmetrically generated leptons are accelerated by an electric field that itself is a component of the more complex process of Phase Space and Phase Time ^[26], and is shown to be indirectly responsible for the mCBR. In fact, it is *the same cosmological process* that *in situ* generates at once the spatial continuum, the cosmological gravitational field of gravitons, and the cosmological photoinertial frame comprising cosmological leptons, their kinetic energy, and the mCBR resulting from local lepton deceleration. The overall phase energy function for asymmetric creation of a single lepton can be summarized as ^[26, 35]:

$$4\alpha^{-2} E_{\alpha e}{}^3 = E_{\alpha e}{}^2 (4\alpha^{-2} E_{\alpha e}) = E_{\delta e} E_{Ge} E_{keCBR} = E_{\delta e} E_{Ge} (\alpha^{-2}h\nu_{CBR})$$
(502)

where the term $(4\alpha^{-2} E_{\alpha e})$ stands for the ambipolar radiation that is generated from the nonelectric Aether ('the medium of Space and Time') to complement the secondary superimposition of Aether energy, $E_{\alpha e}^2$. It is this ambipolar energy component of secondary superimposition that becomes affected to the created light leptons as their kinetic energy E_{keCBR} ^[26], from which the mCBR with photon energy h v_{CBR} is issued upon local deceleration of those cosmological leptons.

For lepton pair creation, this simply takes on the form:

$$8\alpha^{-2} E_{\alpha e}^{3} = 2(E_{\alpha e}^{2} 4\alpha^{-2} E_{\alpha e}) = 2(E_{\delta e} E_{G e} E_{keCBR}) = 2E_{\delta e} E_{G e} (\alpha^{-2}h\nu_{CBR})$$
(503)

This simple, asymmetric expression clearly indicates how the massfree Aether gives rise to Matter, to its electrokinetic energy, to the attendant gravitational field and the residual electromagnetic field or so-called ZPE (also named "the new electromagnetic Aether of space"). Thus, paradoxically, Aetherometry agrees in this respect with Relativity - to the effect that there are gravitational fields even in "empty spaces" ^[36]. This can be easily demonstrated with the aetherometric method, as one of the aetherometric quantum functions for G ^[35] formally demonstrates how G is the necessary result of a cosmic universal acceleration by the ordered flow of massfree energy that all mass is subject to:

$$G = (h^2 E_{Ge}/E_{\alpha e}^3) (\alpha \text{ m sec}^{-2}/2\pi)^2$$
(538)

Before transforming further this equation (see below), we should like to draw the attention of the reader to three features that will become salient in the process of transforming this expression; all three features reflect key aspects of the cosmological nature of the G field force:

1) when expressed with respect to Planckian quanta h, the superimposition of this is further coupled to the non-Planckian quantum or moment of the gravitational field, that belongs to the electron graviton energy E_{Ge} ; thus, the function: $h^{2*}(E_{Ge}/f_e)$;

2) this 'mixed' electrodynamic and gravitodynamic interaction arises from the cubic superimposition of fundamental electron-resonant massfree Aether units of energy $E_{\alpha e}$ ^[30, 37], and thus expresses a fundamental ratio (ie: h² $E_{Ge}/E_{\alpha e}^{3}$) with respect to $E_{\alpha e}^{3}$;

3) the ratio between the two superimpositions (h² E_{Ge} and $E_{\alpha e}^{3}$) is subject to the square of a fundamental cosmic acceleration acting on each Planckian quantum, and directly implicating the value of the fine structure constant and the values of 2 and π , as per: α^{-1} m sec⁻²/2 π .

Thus substitution in the above equation #538 leads to -

$$G = (h^{2} E_{Ge}/4\alpha^{-2}E_{\alpha e}^{3}) \text{ (m sec}^{-2}/\pi)^{2} = (h^{2} E_{Ge}/E_{\delta e} E_{Ge} E_{keCBR}) \text{ (m sec}^{-2}/\pi)^{2} = (h^{2} / E_{\delta e} E_{keCBR}) \text{ (m sec}^{-2}/\pi)^{2} = (h^{2} / E_{\delta e} E_{keCBR}) \text{ (m sec}^{-2}/\pi)^{2} = (h^{2} / E_{\delta e} hv_{CBR}) \text{ (m sec}^{-2}/\pi)^{2} = (h^{2} / E_{\delta e} hv_{CBR}) \text{ (m sec}^{-2}/\pi)^{2}$$
(587)

where it becomes evident (in the last term) - by abstracting from gravitational energy and the phase superimposition processes of nonelectric massfree energy - how the entire intra-lattice interaction can generate G as if by reference solely to the superimposition of Planckian quanta (h²), and its ratio to the superimposition of mass-energy (lepton mass-energy $E_{\delta e} = m_e c^2$) with the "ZPF" energy ("zeropoint field energy") of the mCBR, as the main blackbody mode given by h v_{CBR} . Yet, this microwave blackbody that is so frequently mistaken for the "New Aether" is but a byproduct of *an entirely non-*

electromagnetic physical process whereby the Aether (the real Aether of massfree, nonelectromagnetic energy) generates cosmological Matter and a universal gravitational force constant. It is the electromagnetic field of 'the vacuum state' which requires the planar and volumetric superimposition of massfree nonelectric Aether (the fundamental cosmic form of massfree energy) elements and the *in situ* production of ambipolar radiation (the electric Aether). Note how this ambipolar energy - or *electric* Aether - term results from the ratio of a cosmic acceleration to the cubic superimposition of the cosmic *non-electric* Aether. Note also how the final expression contains only photoinertial products (the electron mass-energy and the cosmic microwave photon) and thus abstracts from the physical process alluded to in the 'parent' expressions.

Aetherometric theory permits therefore the writing of the "ZPE", in its quality of true electromagnetic (photon blackbody) energy mode, as a simple and cosmological function of G:

$$h\upsilon_{CBR} = (h^2 / E_{\delta e} G) (\alpha \text{ m sec}^{-2} / \pi)^2$$
(588)

But, understood in this way, G is not a consequence of the interaction between Matter per se (even if AToS can equally express G as a function of the superimposition of mass-energies, eg of two leptons), or of the interaction of Matter with the "ZPE". Rather, the creation of Matter and the production of a "ZPE" are the result of the complex, phase superimposition interaction that confers acceleration to all the distinct energy sources of Space and Time, whether it is Matter, the Aether or the 'gravitational field(s)', ie the gravitons. Gravity is not caused by a change in the curvature of 'Spacetime' produced by the presence of Matter. Rather, gravity is the product of the cosmological acceleration of photoinertial ("Planckian") and gravitational ("non-Planckian") quanta by the cubed superimposition of massfree aether energy - in the cosmological process of the creation of Matter. Its effect is locally mediated by gravitons, so gravity is a reaction of a "field medium" to the presence of inertial mass. Hence, all accelerated motion is referred to the fundamental, planar and volumetric, aether lattice of elements $E_{\alpha e}$, and not to 'all observable mass in the universe', or to the average (whether vanishing or nonzero) density of mass in the universe. Cosmologically, it is here - in the term for a cosmological, constant and uniform acceleration of the universe, that the ontological inextricability of the unidirectional and universal passage of Time is anchored, both with respect to its synchronic reality as Simultaneity, and to its universal diachronicity - completely contrary, therefore, to the tenets of Relativity, which require the formal abolition of universal Time.

At the end of the day, we do not come so much to agree with Einstein that all inertial systems are, after all, accelerated (which they are), but that they are inertial because they resist acceleration. Hence, we may not have trouble accepting that, if the motion is inertial or, equivalently, if the coupling of Matter to the accelerating field is 'resistive', then lightspeed will serve as absolute limit to the speed of displacement. But this should not impede us from inquiring whether the acceleration
induced by a gravitational field, in particular the cosmological G field, also elicits the same inertial resistance on the part of accelerated Matter, and thus falls within the same speed-of-displacement limit. If there is to be an alternative mode of propulsion that may permit galactic or intergalactic travel, one must first determine whether all forms of field acceleration induce inertial resistance.

1.8. What is and is not physics (4):

Is there real, unequivocal experimental evidence for GR?

Where, then, is the experimental evidence for GR and Einstein's General Theory of Gravitation? Let us summarily consider the claimed evidence, which boils down to five lines that are considered to be distinct and separate:

1. <u>Deflection of stellar light near the Sun</u> by the curvature of Spacetime responsible for the local characteristics of the gravitational field of the Sun. This is, in effect, a prediction based upon Gunmar Nordström's theory of 1913, which Adriaan Fokker and Einstein subsequently adopted to describe a curved Spacetime by the spherical deformation of a plane. Einstein proposed that the effect would be best detected by measuring the shift "in the position of stars near the limb of the Sun during an eclipse" ^[38], and this was confirmed by Eddington's and Crommelin's 1919 expedition to Africa.

Criticism:

There is little doubt that light appears to increasingly deflect as a function of the decreasing distance between its transverse trajectory and a local gravitational attractor. But this is by no means evidence that exclusively benefits GR. On the contrary, since photons are a form of massfree energy, one can think of the bending of light rays in the presence of a (significant) gravitational field as being either (1) a consequence of the geometric (instantaneous) deformation of local Spacetime, or (2) a consequence of a physical process that locally releases photons from massbound charges that decelerate their transverse motion in the presence of a 'strong' gravitational field (in fact, deflection will effectively occur with any gravitational field, irrespective of intensity; it is just rather 'strong' near the limb of the Sun, ie close to the center of an intense gravitational field). Indeed, in the second case, light rays are stochastic composites of these photons (the photons do not travel across space), and it is the massbound charges emitting them which undergo gravitational deflection (since they carry inertial mass); thus, it is not light that bends, but the trajectories of the massbound charges which *emit and relay* light (and all the little arrows that, when put together, compose a ray, as Feynman would say) that bend, as they should, like the orbit of a (slowly) falling satellite.

2. <u>Gravitational redshift</u> of star or planet light, later verified by the Pound-Rebka experiments. Using the Mossberg effect, Pound and Rebka employed a moving platform that could be utilized to blueshift gamma rays from a Fe⁵⁷ emitter ^[39-40]. By producing a counteracting red Doppler shift, Pound and Rebka could cancel the gravitational blueshift ^[41], irrespective of whether the emitter was moving or, instead, the receiver.

Criticism:

If one regards - as Aetherometry suggests, and independently of any Doppler effect - the apparent deflection of light near an intense gravitational attractor as being caused by the bending motion of photon-emitting massbound charges (motion which decelerates in the transverse orbital direction as its free fall velocity increases along the vertical ^[29]), one would expect this deceleration (and thus the decreasing transverse component of the kinetic energy of the moving massbound charges) to present photon emission with decaying photon frequencies. Incremental spectral modal shifts to longer or red wavelengths would result. It follows that one can explain - without any recourse to GR - both *light deflection and the apparent gravitational redshift* by the same process of emission of blackbody light from decelerating massbound charges; they are, in fact, one and the same phenomenon, and thus constitute a single line of evidence, not two (in fact, by Ockam's razor, the aetherometric explanation of the two lines of evidence as a single one would have to be the better choice).

However, redshifted photon production from incrementally decelerated massbound charges is not the only source of redshifted light. Specifically, in what concerns the Pound-Rebka experiments, the prediction of GR reduces, after all, to nothing other than just a first order longitudinal Doppler effect proportional to v/c, and presenting symmetric blue and red shifts. It is hard, therefore, to claim prediction of a motional wavelength shift in blackbody production as being specific to GR. Rather, the specifically relativistic prediction (and from the viewpoint of SR, not GR) with respect to the Pound-Rebka experiments is whether this first order Doppler effect is accompanied by a second order (transverse) Doppler effect proportional to $(v/c)^2$, generally too weak to be detected. However, even this was not a specifically relativistic prediction of SR, only a requirement of all physical theories that uphold the Lorentz-Fitzgerald transformations. The Pound and Rebka experiments could not demonstrate whether or not the Doppler shift involved required application of the (second order) Lorentz transformations; the effect could just as well be attributed to a classical Doppler effect. Consequently, the redshift that GR postulates (a motion-relative redshift, not a decelerational redshift) can be shown not to constitute an independent line of evidence, but one that simply falls under the Doppler effect responsible for apparent retardation (or advancement) of light (see the next line of evidence).

3. <u>Retardation of light</u>: in essence, this was tested in the late 1960's by Shapiro et al, who detected a slowing down of radar waves that were made to graze the solar limb when bouncing back to Earth from Mercury, during a 'superior conjunction' of the two planets ^[42-43]. The measured delay was about 20% smaller than the predicted 160 microseconds. C. M. Will has objected to the

characterization of this effect (the "Shapiro time delay") as "light slows down" ^[44], and argued that the bending of the light path in a gravitational field (the first 'line of evidence' above; Will estimates a negligible delay of 0.001 microseconds due to a *deflected light path* for light 'travelling' from the Earth to Mars and back during a superior conjunction ^[45]) is distinct from the effect of Spacetime curvature responsible for the "apparent retardation". However, since gravity, in GR, is supposedly due to a change in curvature of Spacetime produced by the presence of Matter, both the (negligible) bending of light and its (nonnegligible) apparent retardation can only be understood (in the context of GR, that is) by the postulated curvature of Spacetime. Thus, the differentiation between the two effects seems somewhat specious. Will gives 250 µsec delay for a trajectory from Earth to Mars, and back, with 125 µsec being due to the gravitational redshift (the second 'line of evidence' above), and the remaining 125 µsec being due to space curvature near the Sun ^[45]. In essence, then, if one concludes that the gravitational redshift is just a variant of the Doppler effect, GR's specific account of light retardation reduces to the introduction of Spacetime curvature, and thus to sensibly half of the observed delay.

Aspden has pointed out that the apparent slowing down of the velocity of light entails both a spectral redshift and an increase of the refractive index of what Fock called "the fictitious medium" ^[46]. Aspden further showed that it is possible to derive the GR equation for the refractive index of this 'fictitious medium' -

$$n = 1 + 2GM/Rc^2$$
 (589)

without recourse to relativistic transformations or Einstein's GR theory ^[47].

Criticism:

Effectively a violation of the "inertial frame"-dependent lightspeed invariance characteristic of SR, retardation of light is not a characteristic that is exclusive to GR; what is exclusive to GR is that such violations can only occur when the path of light covers a range of space or a time interval that are large enough to manifest the effects of the curvature of Spacetime. In GR's language, this involves the introduction of more than one frame in the description of the entire light path. However, the pre-GR Sagnac experiment had already and amply sufficed to (1) establish both retardation and advancement of light - that passed through a rotating frame - with reference to the inertial frame of the source or the observer ^[2] (provided the observer shares the state(s) of motion of the emitter), and (2) provide evidence of the effect at a local scale. This should have sufficed to realize that the Doppler effect applied to both linear motion (the longitudinal Doppler effect) and to angular motion (the Sagnac effect). As we said above, redshifted photon production from decelerating massbound charges is not the only source of redshifted light. If we abstract from the transverse deceleration of massbound charges orbiting close to a major local gravitational attractor, the bending of light near such an attrac-

tor resolves into a longer path in a manner perfectly analogous to the Sagnac effect. Since that major attractor, eg the Sun, and the abstract space in its vicinity, are in a state of rotation (with respect to the directions of the path of the light rays), the trajectory of the "radar waves" intersects a rotating frame; it is bound, therefore, to introduce a first order Sagnac-Doppler effect proportional to v/c. If both the emitted and reflected light rays traversed the rotating frame with opposing directions of incidence, then the effect should cancel; but since the returning arm alone was made to graze the solar limb, ie made to (substantially) transmit through a rotating medium, retardation is observed.

Thus, it seems to us, that analysis of GR's prediction of light retardation near an intense gravitational field reduces to a set of two questions:

1. What happens in "global experiments" (Will's expression) when the light rays are made to traverse many different frames, and no single frame can encompass the entire light path.

2. And what happens in such experiments when at least one of the traversed frames is a rotating one.

It seems that the Shapiro et al experiment only examined the second of the two questions. Accordingly, their experiment can be regarded as open Solar-System Sagnac-Doppler experiment that (mostly) retarded the path of the light journey in the returning arm of the "rotating solar interferometer" since the returning arm alone was made to graze the solar limb.

4. <u>The advance of Mercury's perihelion</u>. This is perhaps the best known of the proofs of GR, and much vaunted in that capacity. However, the exact trajectory of the perihelion of Mercury was also provided nearly two decades before GR's solution with computations that do not use any relativistic formulas. In 1898, by assuming that gravitation propagates at the speed of light, Paul Gerber ^[48] arrived at the exact formula for Mercury's perihelion motion that was later presented by Einstein in 1916 ^[49]. Aspden has pointed out that measurement of other perihelion motions (like that of the Earth or Venus) present values that are significantly larger than those predicted by GR ^[50].

5. Confirmation that the principle of equivalence is not violated.

The principle states that two bodies fall with the same gravitational acceleration or changing velocity independently of their mass or chemical composition. Without giving Jeans credit, Einstein interpreted Jeans' equation for the rest energy of a particle -

$$E_0 = m_0 c^2$$
(590)

as a demonstration "that the energy E_0 of a body at rest is equal to its mass", arguing that "mass and energy are therefore essentially alike; they are only different expressions for the same thing" ^[51]. This led him to extend the principle of equivalence to the equivalence of mass and energy. Then, with GR, the principle of equivalence was further extended to apply not just to objects with rest mass m_0 , but to all forms of energy, including the massless photons (ie light itself), this being - in a formal relativistic sense - the reason why deflection of light is not directly assimilated to its apparent retardation caused by the Spacetime curvature (see Will's argument above).

The equivalence principle has a history interwoven with the relation between inertial and gravitational masses, their equivalence, and their ratio being (or not) unity. Translatory inertia, in Newton's conceptualization, is mass in the absence of acceleration. And gravitational mass is the property that permits a gravitational force to act on a body. Newton assumed their ratio to be unity, and in 1890 Roland Eötvös presented results that confirmed this equality precision on the order of 10⁻⁸. Currently, this has been extended to a 10⁻¹⁸ level ^[52]. Though measurement of the free fall of positrons has shown no violation of the principle of equivalence, particle physicists have long kept to a tradition of speculation which holds that, below whatever limit may be currently placed on the equivalence of inertial and gravitational masses, there may still be a violation which will permit antimatter to deviate from the principle of equivalence (see next section).

Criticism:

Adherence to the principle of equivalence is not exclusive to GR (as exemplified by Aspden's theory of the Aether, or by Aetherometry, etc). The reader has already learned above how the physical coupling of gravitons with electrons, for example, constitutes a phase superimposition process that requires precisely the equivalence of inertial mass to a gravitational wavelength, so the absence of such violations is not surprising. Moreover, aetherometric theory has shown that all so-called inertial motion is, in fact, accelerated motion ^[29]. However, we should like to emphasize that Einstein's interpretation of the relation between mass and energy is fundamentally flawed, to no detriment of the Jeans-Einstein formula (#590 above). Mass and energy are not merely different expressions for the same thing. All that this formula does is provide the electromagnetic or photoinertial equivalent of the rest energy of a body. This energy only shows up when an element of matter or antimatter is destroyed such that an ionizing photon or photons results. The formula does not provide the energy structure of a body or particle with rest mass m₀, only the energy structure that results from its disintegration, which happens to be the electromagnetic equivalent energy referenced to the local inertial frame. The structure of all Matter is electrical, and the rest mass-energy of an inertial particle or a material body does not have an electromagnetic structure ^[30, 32]. Accordingly, inertial mass is not the same thing as energy, and even less the same thing as electromagnetic energy. Inertial mass - the kinematic quantity that generates inertial effects - is a property of energy, a constituent of energy and, in fact, a geometrically defined wavelength (as we have shown for the electron, the proton, etc). Thus, in the case of massfree energy elements such as photons or gravitons, there is no rest mass m_0 , or real weight, only an equivalent wavelength (see ref ^[31]) - which, for the graviton, is numerically identical to the length-equivalent of the inertial mass of the element to which the graviton is

affected. A similar numerical identity occurs for the energy of gamma rays and limit hard X-rays bearing Compton wavelengths. Therefore, what the Jeans-Einstein relation presents is not the rest mass (which is just short-hand for rest mass-energy), of a particle or a body, but just its *electromagnetic equivalent*; and what it is not, is an expression of the *electric structure* of that rest mass-energy.

In conclusion, none of these so-called five lines of evidence requires GR in order to be predicted, modeled or explained. One can only say that GR is compatible with the existence of the apparent deflection, redshift and retardation of light by gravitational fields, the advancing perihelion of Mercury, and the absence of violations of the equivalence principle. GR did predict deflection, redshift and retardation, so these first three tests could be seen as GR specific, even if none were first predicted by GR. With respect to the perihelion of Mercury and the equivalence principle, GR can only be said to give an account of that perihelion motion which is better than its accounts of other perihelia, and not to require violations of the principle of equivalence. But since there are other theories, like Aetherometry, which explain the deflection and the redshift by a single physical process distinct from Doppler shifts, everything practically hangs on a single line of evidence and its interpretation: what is the physical nature of the apparent light retardation. If, in essence, this belongs to a Sagnac-Doppler effect, the only question of relativistic import is whether the effect requires Lorentz transformations or not.

Lastly, let us consider two more lines of evidence that particularly concern not just GR but the <u>General Theory of Gravitation</u>:

1. The existence of the fabled lightspeed gravitational waves.

Despite construction of sensitive and very expensive bar detectors for gravitational waves (work pioneered in the early 1960's by Joseph Weber at the University of Maryland, and by William Fairbank at Stanford University), and despite various claims of having found such waves (Weber, Forward, etc), none have ever been observed ^[53]. There is, therefore, no proof that gravitational waves abide by the lightspeed c.

In 1974, J. Taylor and R. Hulse ^[54], at the University of Massachusetts, claimed evidence of gravitational-wave damping from analysis of the decaying orbits of binary pulsars ^[55], but the spiralling together of paired stars is merely compatible with an inference of gravitational radiation carrying away the energy loss from their motion, not an experimental proof that gravitational waves that travel at the speed of light do exist.

2. Detection of the <u>dragging of inertial frames</u> (aka dragging of Spacetime or the Lens-Thirring effect).

Once thought to provide evidence for this effect, the Michelson-Gale-Pearson experiment

yielded, at best, the speed of rotation of the Earth ^[2]. No evidence exists for any "dragging of inertial frames" caused by the Earth's rotation, in experiments with laser-ranged orbiting gyroscopes (prediction is 42 milliarcsecond per year precession ^[56]). Frame-dragging implies precessing rotation of the axes of the local inertial frame relative to the distant stars, as caused by rotation of the Earth. Obviously the rotary axes of the Earth precess with respect to the distant stars - this being the very basis of the Great Platonic Year - and consequently so will the inertial frame of the Earth and the Solar System. This precession is not just analogous to the precession of a magnetic moment outside a rotating charged body, but the very basis for the precessionary drift of the geomagnetic field of the Earth. The GR-pertinent problem, in this respect, is whether the precession reduces to what is called a "geodetic precession" (a spherical surface problem studied by de Sitter in 1916, and based upon "the precession of a ruler in Sphereland", as Will calls it ^[57]), or whether Spacetime is also dragged by rotation, as detected by stationary gyroscopes near the rotating Earth. To this day, there is no experimental confirmation of the Lens-Thirring effect.

Despite the tremendous efforts made to establish GR on a solid, empirically validated foundation, any dispassionate evaluation of the situation will have to conclude that there is no specific proof for GR, and its empirical basis is weak. In particular, those lines of evidence that are really specific to GR reduce to the above two entries under the rubric of the General theory of Gravitation, for which there are, to this day, no experimental proofs - no demonstration that gravitational disturbances travel at the speed of light, or that inertial frames can be dragged by rotation. One can well admit that the science of physics should consider GR as a candidate theory proposing a unified physics, pending its verification; but one is hard put to justify why GR has become established as the dominant model of physics, and the sole ruler of astrophysics, when its verification and verifiability are so tenuous. And it certainly contributed no flight or lift technologies. "Nullo demun loco ineptior est quam (...) ubi nimis pueriliter hallucinatur."

(Never is one more foolish than when suffering under delusions of a most infantile nature.)

N. Coppernicus, 1952 open letter

2. Deliria of Particle Physics

2.1. The ebb&flow notion that antimatter has negative mass: antimatter vs anti-Matter

Maxwell had already noticed that both Newton's law of gravitation and Coulomb's law of electrostatic attraction were inverse-square relations, so he tried to provide an electrodynamic explanation of gravity; but given that the electrodynamic force specifies *repulsion* between *like charges*, and the gravitational force *attraction* between *masses*, it would only work if the sign of the field energy was made negative. However, this led him to a physical impossibility - a system that would infinitely gain energy by gravitating ^[58] - so he abandoned his attempt at integrating electrodynamics and gravitation.

P. M. Dirac's attempt to synthesize the theory of General Relativity and the quantum mechanics of subatomic interactions began by assuming that the minus sign in the field energy equations meant the existence of negative Matter, of anti-Matter and anti-energy. This led him to suppose an "Aether of space" populated with negative mass particles and oscillators, which together gave rise to field fluctuations. As all the negative mass states would be occupied at any one time, space appeared to be empty, yet it was seething with 'virtual [negative] energy'. Early on, this led to the notion that a force of gravitational repulsion might exist between Matter and anti-Matter ^[59]. It was not the field sign that became negative, but masses and Matter which came with a polarity, negative and positive. Dirac-based descriptions of anti-gravitation therefore require that there be two types of gravitic energy and interaction: similar energy states attract (so Matter and anti-Matter repel).

The speculated anti-gravitational properties of anti-Matter are best understood as a subject for science fiction: "It is possible that whereas particles are very feebly attracted to a gravitational field, antiparticles are very feebly repelled by it. In other words, antiparticles produce "anti-gravity" " ^[60]. This has served as a spurious basis for explaining how mass may be degravitated ^[61].

Aspden tried to escape this facile conceptualization and the dead ends it leads to: "One way in which negative energy states can be admitted without association with a true negative mass or energy quantity is to recognize that nothing can ever exist in a region where it would have a truly and so absolute negative potential (...). The author's contention is that if space is at all similar to the electrical structure of a material crystal and if it is populated by negative potential regions, there can be no true negative energy states" ^[62]. Dirac's theory of anti-Matter maintained virtual negative potentials subordinate to the tenets of *negative energy and negative mass*. In contrast, Aspden's solution proposes a reverse or negative potential, not a polarity of mass and energy signs and thus a duality of masses or energies (positive and negative).

Following acceptance of the 1957 Lüders theorem, physicists figured out that antiprotons and positrons are all subject to the same gravity, or to the same positive gravitational effect, as protons and electrons ^[63]: antimatter falls to the ground exactly like ordinary matter. Indeed, as is also required by GR, no violations of the principle of equivalence have been detected by differential acceleration of different materials, down to a 10⁻¹⁸ resolution ^[64]. Spurious reports that such violations existed ^[58] have now been put to rest. Therefore, no anti-Matter exists - in other words, the gravitational 'mass' of antimatter (positrons, antiprotons, etc) is not negative, after all. Yet, the irrepressible notion itself of 'anti-Matter' has survived to this day not only in bad science fiction, but in bad physics. At all times, the operational designation of antimatter - especially given the relative rarity of the latter in free or unbound states - is in danger of slipping into the old concept of 'anti-Matter'; when all that antimatter implies is that there are two axes - of symmetry and asymmetry - in charged Matter: one for massbound charges of opposing polarity and the same mass (hence, negatron and positron, or proton and antiproton); and the other for massbound charges of opposing polarity and different mass (hence, negatron and proton, positron and antiproton, etc). Accordingly, Matter encompasses both ordinary matter and antimatter, and the "positive energy theorem" must be upheld: no negative mass exists. Historically, Dirac's postulate of anti-Matter led to the search for the positron ^[65] and other antimatter particles; as the history of science so often shows, the wrong hypothesis may yet lead to an experimental discovery.

We should briefly note, in passing, that there is one other misconception of antimatter associated with quantum-mechanical theories, in particular with quantum electrodynamics (QED). This is a misconception championed by Richard Feynman, and which interprets antimatter particles as having a negative time direction with respect to the observer's frame.

2.2. Formalisms of the vacuum state:

the canonical and covariant approaches to quantum gravitation

Plenty of formal anomalies have been extrapolated from quantum-mechanical theory ('theories', since it is an eclectic body of theories), and they generally depend upon the quantum-mechanical conceptualization of the 'vacuum-state'. The latter is typically seen as involving only virtual particles, and as possessing infinite energy. These are formal attributes that have led to the suggestion that the 'vacuum-state' has no physical reality, which in turn has encouraged a plethora of nonrigorous formalisms that purport to extract supposedly physical processes from the (arbitrary) normalization of infinite quantities. The 'vacuum-state' then functions as a ratbag of tricks.

Derangement of Physics is an inevitable outcome when one is confronted with the unresolvable contradictions and incompatibilities between General Relativity (1915) and quantum-mechanics (QM, 1926), or particle physics. Others have claimed that these are serious differences which go right to the core of the different methodologies employed by GR and QM: the very fact that the path taken by a particle or body in free fall remains indeterminate and probabilistic in QM is sufficient to argue that there must exist interactions which violate the equivalence principle ^[58]. As of 1916, Einstein considers that quantum effects may modify GR and, by 1927, Oskar Klein suggests the existence of quantum gravity ^[66]. In the early thirties, L. Rosenfeld applies Pauli quantization methods to the "linearized Einstein field equations" ^[67], and subsequently Fierz and Pauli suggest the gravitational field is quantized by spin-2 quanta (see below) ^[66]. According to Rovelli, it was presumably Blokhintsev and Galperin ^[68] who coined the term 'graviton' in 1934, to designate this postulated spin-2 particle. Niels Bohr contemplated for a while the possibility that the graviton was the same as the neutrino.

The main modern theoretical approaches to quantum gravitation, however, came about after WWII. Peter Bergmann ^[69] and his group - at the Brooklyn Polytechnic and then in Syracuse - began the quantization of nonlinear theories of "gauge-independent variables" in 1949, and the *canonical* approach to quantum gravity (metric or relativistic theories) "was born", as Rovelli puts it ^[66]. Following the application of Julian Schwinger's method of "covariant quantization", the *covariant* approach to quantum gravity (gauge theories) was born with Rosenfeld, Fierz and Pauli, and Gupta, in 1952, as an attempt to enunciate a "quantum field theory of the metric over a Minkowski space, or some other background metric space" ^[70]. The system of equations was worked by DeWitt and Feynman in the sixties, and led to the Feynman Rules of General Relativity ^[71]. These two approaches, in one incarnation or another, have dominated the field until today. In passing, the reader should note how the birth of the modern science of quantum gravity in the early fifties coincides with the very peak of all the waves of UFO 'flaps', at a time when these still received much attention from the media, the public, the government and the military ^[72].

In essence, the canonical approach (Bergmann, Dirac, etc) stands for a quantum general relativity that searches, as Rovelli puts it, for a "background independent context" ^[73]. It finds the covariant approach irrelevant because "all experience with quantum field theory is on a fixed metric Spacetime" ^[74]. In the canonical approach, the Hilbert space "carries a representation of the operators corresponding to the full metric, or some functions of the metric, without background metric to be fixed" ^[70]. Completed by the early sixties, the system equations were integrated by Wheeler and DeWitt, but the master "Wheeler-DeWitt equation" was too ill-defined to permit calculations. The shortcomings of this formalization led to a redefinition of the canonical approach in the late eighties, in the form of "loop quantum gravity" (Jacobson and Smolin in 1988 ^[75]), and at last, by the midnineties, computational solutions could be 'performed' in the "first Planck scale" (the spectra of eigenvalues of area and volume).

In turn, the covariant approach (Rosenfeld, Pauli, Feynman, etc) ran aground by 1975, since "t'Hooft and Veltman, Deser and Van Nieuwen-Huizen, and others, found firm evidence of nonrenormalizability" of the divergences obtained in GR with matter fields, and the "search for an extension of GR giving a renormalizable or finite perturbation expansion started" ^[70]. Eventually, in the late eighties, through the use of derivative theory and 'supergravity', the covariant approach gave rise to "<u>string theory</u>" which, at last, 'permitted computations' of the gravitational perturbations ('quantum gravity scattering amplitudes'). As Rovelli puts it, the inheritors of modern covariant theory regard the canonical approach as being, at best, "a low energy limit of a much more complex theory, and thus [as something that] cannot be taken too seriously as an indication on the deep structure of nature" ^[74]. Yet, one should ask, can one take covariant theory seriously when, as Rovelli notes, its completion was 'achieved' at the cost of "the wrong dimensionality of Spacetime" (sic) ^[76], even by GR's criteria?

There are other approaches to quantum gravity besides these two large-scale research programs. Rovelli gives some prominence to "the sum over histories" approach - which follows Feynman's program of integral quantization, includes Hawking's "Euclidean quantum gravity", and has led to the more recent spin-foam models of the nineties. Spacetime quantum foam was a "geometrodynamic" idea created by Wheeler in 1963 ^[77], when he realized that the quantum fluctuations of the gravitational field had to be short-scale. Wheeler is also the creator of the idea of "superspace" ^[77]. The debacle of the 'nonperturbative models of string theory' in the late eighties later inspired the spin-foam models of quantum gravity, and provoked a renewal of such models in string theory (branes, dualities, etc) from 1995 onward.

It has been perceived as advantageous for the practice and institutions of official Science to have two main conflicting models that dispute the quantization of the gravitational field. Each pulls the other towards an ideal unification, in a relay race that "keeps hope alive". Fads alternate, as the allocation of power in two-party representative democracies does. Each version officiates for a while as the official one. Yet, even as instrumentation permits measurements closer to the "Planck scale", no violations of equivalence and no experimental verification leaps out to validate one or the other of the two dominant models of quantum gravitation.

A brief survey of the two dominant approaches to the problem of gravitational field particles or quanta suffices to grasp the formalistic chasm between them. Fermi and Dirac had already suggested that field forces resulted from the exchange of particles, in particular virtual ones. The electromagnetic field was mediated by photons, the strong nuclear field by pions or other mesons, and the gravitational field by gravitons. However, neither approach stopped here (see below), as the particle zoo inevitably proliferated when it came down to the description of the gravitational field.

Fig. 1 The Wheeler-Ivanenko Symmetry



The quantum-mechanical notion of the graviton is a very confused one - all mass, such as the Earth, would constantly shed these gravitons in all directions at the speed of light, and somehow these emitted gravitons would accelerate any target mass, an attractand like the Moon, towards the attractor, viz the Earth. How emitted particles that are directed upward, or away from the apparent emitter, come back to transfer momentum in a direction opposite to that of their emission (ie downward) remains a mystery. Moreover, as we have already mentioned, in modern quantum-mechanical theories this hypothetical graviton was assigned a spin 2, supposedly to reflect the fact that whereas like charges repel, like mass-bearing particles attract... According to Wheeler and D. Ivanenko (see Fig. 1), electron-positron pairs could transform either into a (gamma) photon, or into a graviton. Comments Paul Hill, a retired NASA physicist: "The spin of the electron is 1/2 and of the positron 1/2 and can be oriented to suit, adding to 0 or 1. Now, how can Ivanenko's graviton having a spin of 2 result from a reaction having a spin of 1 or 0? Since other particles artificially created come in pairs, better we should create a graviton-antigraviton pair with a combined spin of 0, selecting 0 spin before and after" ^[78]. Quantum-mathematical fads have come and gone - but such idle speculation has been rewarded by academic and peer-reviewed publications.

The introduction of quantum field theory led to the theoretical hypothesis that two more integer-spin particles should be added to the spin-2 *graviton*: the spin 1 *graviphoton* and the spin-0 *graviscalar*. The even spin particles - the spin-2 graviton (tensor) and the spin-0 graviscalar (or scalar graviton) - were said to produce a "purely attractive force" ^[58] between matter and matter, antimatter and antimatter. Conversely, the odd spin particle - the spin-1 graviphoton that coupled electromagnetic and gravitational fields - depended on the nature of the

interacting particles: it induced a *repulsive* force between matter and matter, and antimatter and antimatter (ie between like masses), and instead an *attractive* force between matter and antimatter (ie between unlike masses).

By the late seventies, the covariant approach had spawned the notion that it should be possible to overcome the inconsistencies in quantum general relativity by again invoking some form of field symmetry. This led to formal and arbitrary groupings of fundamental particles into geometric 'families' that obeyed the then predominant fad of 'supersymmetry'. Initiated by J. Wess and B. Zumino, 'supersymmetry' claimed to resolve (!) the inconsistencies in 'quantum general relativity' by coupling a half-integer-spin particle to every integer-spin particle. To the spin 2 *graviton* was added the neutrino version of the gravitational field - the massless (invisible) *gravitino* with fractional spin 3/2, that supposedly resulted from the decay of the graviton and in the then emerging theories of 'supergravity' was responsible for antigravity ^[79-80]. Likewise to the *graviphoton* of spin 1 was added a '*goldstino*' of spin 1/2 resulting from the former's decay.

Not to be outdone by the the supersymmetry 'theorists', metric or canonical theory 'returned to the charge': it proposed that spin 2 gravitons existed in higher-dimension continua (5 or more dimensions) as *massfree* particles ^[58] that decomposed, in "ordinary four-dimensional Spacetime", into a spin-2 graviton, a spin 1 graviphoton and a spin 0 graviscalar. Supposedly, this process accounted for all the separable gravitational interactions.

Common to both approaches was the notion that *attraction* between like masses was mediated by the mass-carrying graviscalar particle, whereas the mass-carrying graviphoton mediated *repulsion* between like masses *and attraction only* between unlike masses. In the matter-antimatter interaction, all three particles - graviton, graviphoton and graviscalar - would add their field-forces, whereas in the ordinary matter-matter interaction the graviphoton and graviscalar contributions would cancel, leaving the action of free fall under the sole control of the graviton (see Fig. 2). This suggested that antimatter would experience a greater acceleration towards the Earth than matter, yet no evidence exists of such a violation of the equivalence principle. It also made possible the notion that an engineering of the graviphotons could lead to the control of antigravity. It is far from clear what this would entail, since the field-forces of both the graviton and the graviscalar particles would also have to be cancelled.

The formalistic rationalizations for these contentions, or models, are entirely devoid of experimental verification and often fully deserving of derision. Some example arguments such as: that whereas gravitons act on the entire mass of a body, antigravity acts upon its quark constituents; that the massless gravitino could acquire mass due to symmetry breaking at high temperature (billions of degrees Kelvin); that supersymmetry 'ameliorates the infinities' created by the quantization of GR, by inventing half-spin particles which permit their cancellation... Thus, one was 'strung along'.

Over a quarter-century later, the promise that supersymmetry or string theory could yield a





"true quantum theory of gravity" is no longer remembered, let alone mentioned. Another fad bit the dust. But that did not stop the journals *Science* and *Nature*, and other overvalued publications, from extensively propagating such formalist garbage that did not, and to this day does not, classify even as scientific speculation. M. Waldrop wrote in *Science* ^[81]: "supersymmetry has the kind of abstract beauty that leads people to believe it is true". The extent to which Physics has been reduced to religious fantasy (belief) and subjective aestheticism (formal beauty, *quid est*, if not simplicity?) is here well in evidence.

Supersymmetry, in trying to conciliate GR with quantum mechanics, swept clean whatever was left inside the Pandora's box once laid open by the absurd reliance of Physics upon the senseless formalism of metaphysical mathematical theories. The proliferation of multidimensional spaces began with the notion of a "superspace" having not only the traditional 4D of Relativity but, for good measure, another 4 dimensions that obey a 'new' multiplication law:

$$A \times B = -B \times A \tag{591}$$

Supersymmetry and its notion of 'supermanifolds' was basically a rehashing of T. Kaluza's theory of 5D Spacetime and the cousin scalar-tensor theory (Dicke, Bergmann, Jordan and others), which assumed the existence of a fifth unobservable dimension of "Spacetime". But supersymmetry was no more successful than its predecessors had been in unlocking the 'secrets' of the gravitational field.

The supersymmetrical absurdities were raved about as a matter of aesthetic comprehension of the symmetry of "totally unified theories", or TUTs. We know now where this idiocy led - to the touting of 290-plus dimensions by idiot-gurus like J. Sarfatti and S.-P. Sirag ^[82].

By 1990, the supersymmetrical delusions had been replaced by new ones - this time contributed by A. Ashtekar, L. Smolin and C. Rovelli ^[83-85]: it was the renaissance of the canonical approach known as quantum loop gravity (see above). The unification of quantum mechanics and Relativity now demanded that, for quantum principles to also rule gravity, the equations of GR should be unified with those of electromagnetism, not for points in space, but for loops in space, spaced apart by the 'Planck length' of 10^{-35} m.

The achievement of quantum-loop gravity supposedly came in 1995 ^[86], when it yielded a computation of the eigenvalues of the 'loop' area A_i based upon 'an n-tuplet of half-integers':

$$A_{j} = 4hG \sum_{i=1,n} [j_{i}(j_{i}+1)]^{0.5}$$
(592)

The student of Aetherometry will immediately realize that this is a dimensionally inconsistent equation, for it basically equates an area (of dimensionality L^2) to the product hG (of dimensionality $L^3T^{-1*}L^2T^{-2}$), a veritable achievement of illiterate mathematics:

$$L^2 = L^5 T^{-3} !!!$$

It took nearly a decade for quantum-loop gravity to misinterpret the concept of area (forget about the loop). L. Smolin may well be right - after 25 years, string theory has not yielded a single testable hypothesis; we should add - nor a single useful concept. But then, neither has quantum-loop gravity. That's perhaps the reason why a system of fashion is the most marketable necessity for the survival of the priests of Official Physics - so we can now find the same L. Smolin teamed up with a new 'irreverent' fad, the "Double Special Relativity" (DSR) of G. Camelia and J. Magueijo. Camelia has

the GUTs to declare that "the religion of SR is dead" ^[87], and then goes on to invent a new one, by proposing that there is a scale and invariant length (the 'Planck length') limit to classical interactions, beyond which the universe is quantal. Marry to this Magueijo's slapstick notion (which he admits "was conjured from thin air" ^[87]), that c was faster in the period following the Big Bang, and you get the new supermodel where light of higher frequency (or energy) is now supposed to travel faster than light of lower frequency (or energy). Smolin claims that, after a decade, he is no longer confused...

Feeling the heat of our frontal attack, some scientists (most often anonymously - ah, the stout hearts!) accuse us of having a chip on our shoulders. If they were even one wee bit right, that 'chip' would be more like a star on our breasts. For it is their gravest error to mistake either our humour or our contempt for their mockery of science, as jealousy for the *Potestas* they wield - a *Potestas* we never sought, and which ranks lowest in our ethics. Thereby they avow to have hidden their politics behind science; whereas we have made a point of searching in science for a politics that affirms life, and only there finds its *ethos*.

2.3. Aetherometric critique of quantum-mechanical models: how they managed to misunderstand both gravitons and photons

AToS can well accept the quantum-mechanical tenet that gravity is not a property of Matter *per se*, but the property of gravitons that are associated with Matter but distinct from it - with the force of gravitation being interpreted as the result of a continual exchange of hypothetical particles or gravitons between the elements of Matter. As the photon mediates the electromagnetic field, so would the graviton mediate the gravitational field. We should further note that, in full agreement with Aetherometry, quantum gravity theories view photons and gravitons as "massless particles" ^[58] that, respectively, mediate the electromagnetic and gravitational fields. However, quantum gravity theories have been stuck in a morass, mostly caused by acceptance of the wrong equations of electromagnetism and electrodynamics (including their precocious amalgamation into one theory), which lead to the apparent conundrum of an infinite range for forces that are mediated by massless particles.

So beyond agreeing that gravitons mediate the gravitational field and are devoid of mass, there is not much one can hang on to - from an aetherometric perspective - when it comes to what has become of quantum mechanics since Planck discovered the quantum of action h, and the field fell into the lap of the Heisenberg-ians (no better reason to remain unsure than being assured of uncertainty). Throughout the present AToS volume, Aetherometry demonstrates that gravitons are neither a fixed size particle, nor mass-bearing (see for example ^[30] and ^[88]). Any potential agreement between present-day quantum mechanics and Aetherometry could only go as far as positing the existence of a graviton that mediates the gravitational field action and defines a gravitational frame of reference (effectively, for AToS, an energy field). But it all stops there, since AToS demonstrates that these gravitons form a Periodic Table parallel to that of the chemical elements, and that they are massfree and anchored to the same energy which is responsible for inertia, ie to mass-energy. The speculative quantum-mechanical models are not even capable of defining the gravitational quantum of linear momentum, \mathbf{p}_{Gn} , or its angular moment, since precisely what characterizes the latter is that it is *not* Planckian. This can be formally stated, in aetherometric terms, in the form of an inequation, as shown here for the electron (ie any negatron or positron, since our concept of Matter encompasses both 'matter' and 'antimatter'):

$$\mathbf{p}_{\mathrm{Ge}}\,\boldsymbol{\lambda}_{\mathrm{e}} \neq \mathbf{h} \tag{593}$$

But it is not simply the concept of the graviton which is wrong in all interpretations that quantum gravitation has spawned. It is the *ad hoc* invention of other particles, even more spurious than the graviton. And it is even the way it conceives of the action of this graviton, or even worse, of the action of any possible antigraviton. Relative to the inertial center of a large mass (our attractor), the Wheeler and Ivanenko model requires the graviton to have an upward thrust, so that the antigraviton must have a downward thrust. How, then, can its action be effective? To answer this, we're told that one must look for a photon analogy: "to carry its role, the antigraviton will have to reflect from the target" as if it were a photon reflecting from a mirror, says Hill ^[89]. So, to the already troubling requirement that both gravitons and antigravitons be emitted particles (radiating isotropically through space), is added the even more troublesome requirement that the antigravitons must also be reflected *for matter-to-matter repulsion to take place*. Now, since the net force in a gravitational field constitutes a single function oriented towards the center of the greater mass (the phenomenological attractor), the gravitons must act downwardly - as both metric and supersymmetry theories admit in their common diagram of the action. But how can gravitons act downwardly if they are to be upwardly ejected from the attractor?

Clearly, it is the attractor that must draw these gravitons onto itself. The question then is: from where do they arise to begin with? AToS's response to this problem is to consider gravitons as arising directly from the 'Energy Plenum of Space' in a Phase Space and Phase Time condition that synchronously binds (anchors) their energy to the mass energy of the corresponding elements of Matter ^[30]. Depending on the local field strength and for any given unit of Time, a number \Diamond of these gravitons, at specific frequencies characteristic of each element of Matter, constantly flows in and out of any given mass-energy volume of Space (its moment of Inertia as Space-Volume); this constant flux is locally sustained by, or produced from, massfree energy, and returns back to it; one can call it a reaction of the "Plenum" to the presence of mass, or the conservation of mass-energy. This constant local flux *acts downwardly (towards the local mass attractor) on the mass-energy* it is affected to, thus phemomenologically appearing to form a 'draw-field' centered on the attractor. Conversely, if we exclude from antigravity, as we should, dynamic effects, such as those of 'levitation', then positive lift can be explained by downward emission - but not necessarily. In fact, in aetherometric theory, as we shall see in the following chapters or monographs, antigravitational work does not need to occur in a relationship of superimposition with mass-energy, the way gravitons and the gravitational frame do. *Transfer of weight to the cosmological Aether lattice* presents secondary superimposition of gravitons and elementary mass-energy - but weight may well also be counteracted by massfree energy in a frame distinct from the gravitational one, an 'antigravitational frame' as it were. And this may well be the same frame as that of the primary, nonelectric, nonelectromagnetic massfree Aether. In other words, we may have to distinguish between antigravity, *qua* 'negative gravity', that results from alteration of "phase gravity" (eg electrodynamic) or directed "weight transfer", and antigravity (or weight neutralization) that results from kinetic states associated with 'buoyant', 'adiabatic' or 'latent thermal' energy manifestations.

In this context, we may legitimately suspect that the modern quantum-mechanical notion of 'supermanifolds' stems directly from a conjunction of (1) the impotence of relativistic 4D Spacetime to account for the Time manifold at all, and adequately for the concept of energy (both with 'matter fields' and massfree ones), with (2) the 'intuition' that there are Phase Space and Phase Time interactions which have cosmological significance but escape the methodologies of present-day Physics ^[23-25]. This, once again, illustrates the sheer incapacity of these theories to account for the real physical processes of secondary and tertiary superimposition, the nature of gravity and gravitation, nuclear fusion, electrodynamic interactions, and the creation of Matter.

Finally, one can see what it is that Camelia and Magueijo are in vain trying to get at, with their only too hegelian desire to both retain and overcome Relativity, or clothe the old with 'new' robes: they sense what AToS contends - that transmission of the excitation responsible for the local production of light occurs at a variable speed which is not limited by c. It is not c that speeds up or slows down - nor can the Big Bang cosmology provide any clue to this, simply because there has never been a Big Bang! What slows down or speeds up is the *ambipolar radiation*, the massfree electric radiation with wavespeed W_v which transmits, from locality to locality, the excitation responsible for local photon production, according to *the aetherometric law for the derived photon frequency* (see ^[26, 90-91], where we documented and established the scale of variable wavespeed characteristic of ambipolar energy), here applied to the case of photon production by the shedding of electrokinetic energy from light leptons (for which the magnetic field wave has the fixed value of W_k):

$$W_k W_v / e = v \tag{594}$$

In other words, only the Planck frequency of the photon reflects the variable speed of the underlying ambipolar radiation.

The reader should also note the confusion to which quantum-relativity is led by the relativistic misinterpretation of Doppler shifts. As we discussed in section 1.8 above, the notion of the socalled 'gravitational redshift' suffers from an intrinsic confusion between actual longer-wavelength light emitted from massbound charges that are incrementally decelerated by a gravitational field, and apparent redshifted light due to the Doppler effect between the relative states of motion of an emitter and a receiver - such as it actually happens in the Pound-Rebka experiment (really a pseudo-gravitational redshift). Misunderstanding the observed retardation of light 'due to Spacetime curvature' for a slowing down of light effectively opened the way to hypothesize that light can speed up or slow down if it crosses accelerated frames ^[92]. There is a nonrelativistic solution to all these 'electromagnetic paradoxes' posed by the relative motions of emitters, transmitters and receivers - though here is not the place to suggest it. However, despite the nonsense that has been written on the topic of the acceleration and deceleration of light - as if photons really did exist with waves that varied in speed! - there is a grain of intuition in the entire subject, an intuition precisely of the variable speed of propagation of the electric fields (so-called "fields of electric potential", see note ^[20]) that accelerate massbound charges and are ultimately responsible for the indirect production of photons.

However, the fundamental reason why conventional physics - quantum-relativity included is ignorant of ambipolar radiation is not because the stationary Aether was done away with by SR, or the Michelson-Morley 1887 experiment; indeed not, since ambipolar radiation is a non-stationary form of Aether energy! The real reason why relativity and quantum physics do not accept the existence of propagating electric *energy* fields with variable speed as the necessary mediators for the production of photons in the so-called "transmission of light" is twofold: the reduction of electric fields to energy-less (whatever that might be!) "fields of potential"; and the dogma that the universe must be seen as being charge-symmetric (ie to contain equal numbers of positive and negative charges). In particular, this last argument has the corollary that an electric field can only exist if one type of monopolar charge predominates over the other; another corollary is that neutral particles can only be formed by balanced monopolar charges, ie have a salt structure. This dogma and its two corollaries are at the root of why Official Physics is incapable of realizing the existence of ambipolar electric radiation, and thus the existence of massfree electric fields indirectly responsible for the "transmission of light": the charges mediating these fields are ambipolar - not monopolar - and thus phenomenologically neutral, and are so without any need to invoke a salt-structure of monopolar charges. Evidently, these ambipolar charges also carry energy - and that is how a *massfree electric field* is able to accelerate the monopolar, massbound charges bathing in it. There is no light-carrying medium, no stationary or dragged Aether. There is only a massfree electric Aether that - through its motion - indirectly transmits the light-producing impulse via the acceleration of massbound charges.

Lastly, as for the mythical Planck length, it need not figure in at all - it is irrelevant, as irrelevant as the notion that it might be subject to Lorentz contraction, or that in accelerated systems lengths are unchanged for as long as they are radial... In over one hundred years, Physics has spent on these deranged, unresolvable but spectacular fictions more capital, in all of its forms, more rivulets of ink and peer-reviewed paper, than any uncertainty of our basic knowledge of nature could ever warrant. There is no starker example of the failure of peer-review and academic institutions in sustaining the interest that nature should have for science - and one can legitimately venture that this 'science', this religion of double-plus-relativity and triple-A uncertainty, is nothing short of a self-perpetuating mechanism for the justification of a parasitic class of white robes in charge of making thought impotent in their own image. If ufology has become an industrialized farce, gravitational physics - whether relativistic or quantum-mechanical - has become a farcical science, a grant industry. "For I perceived that, if light was propagated in time, the apparent place of a fixed object would not be the same when the eye is at rest, as when it is moving in any other direction than that of the line passing through the eye and object; and that when the eye is moving in different directions, the apparent place of the object would be different."

J. Bradley, Miscellaneous Work and Correspondence

3. Gravity: Propagation or Instantaneity?

3.1. Van Flandern's theory of noninstantaneous propagation of gravity

T. van Flandern's theory of gravity is one more attempt to salvage Relativity: in place of SR he invokes "Lorentzian Relativity"; and he preserves GR but with a "different interpretation". His twofold objectives can be described as an effort to make Relativity self-consistent by preserving causality while sticking to the 4-D flat spacetime, through the simple means of introducing the notion of faster-than-light propagation speeds for force (any gravitational radiation would still comply with c as the limit speed of propagation). Van Flandern speaks of "Lorentzian Relativity" - maybe hoping to remind the reader that, before it became the Einsteinian doctrine of the aetherless curved spacetime, relativity (before it became Special...) was already the last resort of the static & dragged Aether doctrines. The core of his argument centers on the actual absence of detectable aberration in the propagation of gravity takes finite time to propagate, albeit that its speed cannot be reduced to c [93].

Both Newtonian theory and GR agree that changes in any gravitational field affect not only the locality of the action but also the whole universe. Newton, despite being convinced that actionat-a-distance "without mediation of anything else" was a "philosophical absurdity" ^[94], settled for the contention that the propagation of the force of gravity across Space was instantaneous. Relativity, on the other hand, enjoyed a fundamental ambiguity: whereas SR prevented propagation of energy at speeds greater than that of light in the vacuum, the geometric 'meta-phoria' of GR suggested that some instantaneity of action was possible by the curved deformation of Spacetime. Van Flandern correctly remarks on the paralogism of the central geometric metaphor of GR, a feature we have frequently stressed: that no body would slide through a flat curved Space - or curved Spacetime, in the relativistic perspective - if a gravitational field was not already acting upon the 'slide' geometry; in the absence of gravity itself, whatever that might be, nothing would slide down the flat curved Spacetime. In other words, the "rubber sheet" analogy of space curvature ^[95] is a loaded metaphor, not a physical explanation. Van Flandern also draws attention to the fact first brought out by Eddington in 1920 - that acceptance of c as the speed of propagation for gravitational waves deemed to be responsible for the gravitational attraction introduces retardations that would cause significant changes in those interactions, and this is simply not observed. On flat spacetime, any finite propagation of 'the gravity force' at speed c requires orbital instabilities that contradict the observed conservation of angular momentum.

Van Flandern wonders why the propagation direction of solar radiation (which he mistakes for the travel of solar photons) is not "parallel [or antiparallel] to the direction of the Earth's acceleration toward the Sun?", only to conclude that there are two distinct propagations involved - that of (1) gravitational radiation and that of (2) the propagation of the force of gravity and its effects across Space. He concedes to Relativity on the propagation of radiation, but holds on to Laplace's 1825 critical notion that the propagation of the force of gravity *must be considerably faster than that of light* (Laplace's lower limit was 108*c). This is the fundamental point of divergence of van Flandern's theory from both the Newtonian and the Relativistic models: that only the instantaneous positions of all masses give the 'true' values of the computations - values which fit observation - but not because there is true 'instantaneity' of action, or true simultaneity for those positions; instead, *the force of gravity* takes a finite time to propagate, but at a speed *much faster* than c. Van Flandern postulates for this speed a lower limit of 20*c, on the basis of solar eclipse studies showing that maximum eclipse occurs well before the maximum gravitational disturbance, but settles for an abstruse value of $\ge 2^*10^{10}$ c on the basis of an *ad hoc* adaptation of empirical radar ranging formulas ^[93].

Van Flandern's approach has the virtue of rejecting the aprioristic geometrism of GR, which ignores aberration and denies any propagation to the gravity force. Like Newtonian theory, GR's position is tantamount to accepting an infinite propagation speed for gravity - at the very least for the so-called near field. Van Flandern's theory avoids this error - but it settles for preserving the 'intrinsic value' of the transformations of SR, by referring all Lorentz transformations to an hypothetical fixed frame ^[96]. In fact, he argues in favour of an amorphous stationary Aether (that he terms "elysium") that "should in fact be identified with the local gravitational potential field, which is of course a different frame from place to place" ^[97].

Van Flandern's ideas have drawn the attention of other physicists, Arp in particular. After toying long and hard with GR, Arp also came to the conclusion that gravitational fields could not operate by exchanges of waves travelling at speed c ^[98]. Realizing the need for near-instantaneity on the part of gravitational action, Arp concluded that T. Van Flandern's theory of faster than light gravitons (>2*10¹⁰ c) formed a better model for its transmission without falling into the pitfalls of either Newtonianism or GR. However, Arp is too enamored of metaphysical features: just as Van Flandern retains planar spacetime and a variant of SR as 'Lorentzian relativity' (the real McCoy), so does Arp retain the notion of a "perfectly flat, Euclidean space" (if for nothing else but to throw out the curved spacetime of GR). Van Flandern had kept gravitational waves at speed c, but they did not convey the force of gravity, only the necessary gravitational radiation that opposed the gravitational attraction;

Arp now posits the gravitons as the particles that will convey the force of gravity at "nearly instantaneous" supraluminal speeds. They travel from the Sun to the Earth, for example, to convey what he calls (gravitational) "information". He suggests that they are "very low mass particles with a huge De Broglie wavelength compared to photons", and thus hardly interact with the "intergalactic medium" when compared to photons.

Eventually, this collage leads Arp to his "variable mass theory". Here he interprets mass-accretion in quasars, galaxies and planetary systems as a micrological process based on the 'growth of the electron mass with time'. He suggests that faster-than-light low mass gravitons may well be "creating mass", or depositing mass "in the interior of the Earth", causing it to expand and become heavier by quantized steps.

To us, all this seems like a gargantuan and compound miscomprehension of the processes going on in accelerators - the error of particle physicists - and in astrophysical processes - the error of relativists and even maverick astrophysicists: that the property of inertia is misapprehended precisely where it asymptotically resists increasing kinetic energy; there, it prevents exactly the growth of mass of the accelerated particle. And, in doing this, in resisting accretion of mass or the variation in inertial mass, they serve as "condensing elements" for the mass of created particles. So, effectively, whatever processes reside in the core of galaxies, stars and *some* planets will undoubtedly capture massfree aether energy and create mass that is deposited "in their interior".

Moreover, it is hard to see how a field of particles moving from the Sun to the Earth could be responsible for a force of attraction. This is the same exact criticism that we have already addressed to quantum-mechanical theories of the graviton. More likely, the Sun should have to *draw* something from the Earth or the Space in between ("the intervening medium"), so as to attract the Earth. Van Flandern suggests the gravitational field acts in directions non-parallel to the propagation of "lightpencils", but in light of our criticism above of GR's hypothesis of "light bending by gravitational fields" (or, effectively, by the invoked curvature of Spacetime), it is an unwarranted supposition; in fact, it is as unwarranted as the confusion of ambipolar electric fields that propagate longitudinally and are ultimately responsible for the local production of light, with the graviton energy elements that compose every gravitational field - even that associated with the Aether lattice continuum. Quantumrelativists of the metric and supersymmetry schools felt the need to distinguish between gravitons as particles that push down (even if their mechanism appears paradoxical) on attracting matter versus the imaginary particles (see preceding section) that push out, or pull apart, and thus repel matter (or antimatter, as the case may be). In their scenario, gravitons would have to push 'down' on the Earth towards the Sun, travelling in directions opposite to those of Arp's gravitons that impact the Earth and come from the Sun.

3.2. Aetherometric treatment of the apparent propagation velocity for the force of gravity, and Bradley's aberration

Once we abandon either of the relativistic notions of continua - whether flat and Lorentzian, or curved and Riemannian - the problem can be easily solved by a few fundamental aetherometric considerations that we shall now summarily present.

1) The gravitational force is only *nonlocal* to the extent that it derives from a cosmic acceleration of a pervasive, fundamentally isotropic energy continuum of Space and (universal) Time. With reference to this continuum, the gravitational force can be expressed as a function of the continuum's massfree energy, or as a function of the resultant superimposition of mass-energy and graviton energy ('creation of Matter'), or still as a function of massfree ambipolar energy and the microwave and radio cosmic background radiations that it gives rise to (see below). This has been demonstrated extensively by us ^[26, 30, 35], and is an ongoing topic in the present AToS volume. Accordingly, and by the universality of Time, all proximal gravitational effects deploy local synchronization precisely because of the nonlocal continuum to which they are, at all times, locally and instantly referred. Local synchronism is the only possible meaning of instantaneity, qua simultaneity. From this aetherometric viewpoint, the entire argument of Newtonianism versus relativity is a bogus one - for the local action (energy deployment) is instantaneous *even if the apparent effects of force do effectively take time to propagate*.

This can best be grasped by understanding gravity as the result of the cosmic acceleration of the massfree-energy forming that energy continuum of Space and Time. There is no region of the universe that is immune to it, or can be made immune to it. Any mass-bearing body bathes in this continuum and is therefore subject to a constant acceleration. The primary interaction between the rest mass of a body and the continuum is all that is needed to understand the true force of gravity or how there is no corner of abstract space that is exempt from a gravitational field. To understand gravity there is no need to consider two bodies, or the action as seated on their masses; it is only when considering gravitation that such apparent considerations are germane.

One can therefore distinguish a *primary* gravitational interaction from *ordinary or secondary* gravitation. Efforts have been made by others (eg Assis) to view these as a function of the proximal versus distal distribution of mass in the universe - with macroscopic gravity in the near field being largely the dominant effect conceptualized as a function of strong anisotropic distributions, whereas the 'far field' (conceptualized as essentially having an isotropic distribution) would be essentially responsible for effectuating the force of inertia. But the problem here, too, is badly posed. There is no locus of Space exempt from gravitational fields, because the energetic matrix of Space and Time everywhere generates a near-isotropic distribution of massfree ambipolar energy and cosmological leptonic mass-energy; the mCBR is but a residual marker of this ongoing permanent process of creation

and resorption of Matter. And the aetherometric treatment of G as a microphysical cosmological constant directly demonstrates how this very process of creation of Matter confers a fundamental cosmic acceleration on all Matter.

In subsequent monographs we shall present a further treatment of these primary and secondary gravitational processes.

2) All motions must be treated in volume-Space, not flattened, as a relationship between trajectories that result from a co-ordinated, synchronized superimposition between energy flows. This comes back to one of the insights of W. Reich - similar to van Flandern's notion that existing gravitational physics misses the transverse component of the gravitational interaction. From the preceding consideration, it is the transverse component that constitutes the true gravitational force: each body in a locality is accelerated by the continuum in parallel directions, the weaving of the paths of several such bodies resulting in mutual satellization; hence, velocities arise in their paths that are maintained by both the flow of the continuum and the gravitational interaction of the bodies, and which can be made relative to those bodies (ie relative to their states of *acceleration*) or relative to the matrix accelerating them and its state of acceleration. Take, for example, the Solar System: no planets fall toward the Sun along the line of the vertical where apparent gravity is deployed; instead, planets and Sun are deployed transversely to this line, across Space, by a helicoidal motion that permits them to keep their relative mean distances constant. They all share a common motion (dance), being as they are transported by the same energy stream.

3) Van Flandern states that there is no cause to doubt that photons "arriving now from the Sun left 8.3 minutes ago". Yet, no one has travelled the distance with tagged photons to verify this supposed fact. It is arrived at simply by dividing the distance (or an uncertain distance) between Earth and Sun by c. But that only makes sense *if it is light that travels* at speed c *from the Sun*. However, Aetherometry has demonstrated that light travels nowhere other than on the spot, as it were, and what transmits the excitation of light is not light but ambipolar radiation ^[90]. Hence, there is every reason to suppose (1) that the photons we see do not ever arrive from the Sun but are born in our volume-Space neighbourhood ^[90], ie in the terrestrial atmosphere, and (2) that what arrives from the Sun, not being light or photons, is not bound by speed c. In fact, as we have shown elsewhere, it has a longitudinal wavespeed that varies from star to star, and in the case of the Sun is exactly $3.5*10^9$ m sec⁻¹, ie $11.7c = \eta \ 10^{-1} c \ [90]$.

Does this contradict the notion that the visible Sun at any moment is 8.3 minutes old, or that Bradley's constant aberration is real?

No; what it says when it comes to light is that there are, so to speak, two images of the Sun formed for an earthly viewer - one visible, that is 499.12 seconds old, and another invisible or 'dark',

that lies 20.42 arc seconds in front of the visible Sun and is only 42.4 seconds old. It is that 'dark' position that, according to AToS, constitutes the actual position of the Sun 42.4 seconds ago (measured back from t=0), *when it exerted its gravitational pull on the Earth*. We will *see* the position of this dark Sun, now as a visible one, at (498.08 sec) - (42.4 sec) = 455.68 sec into the future. What happened in the past (the dark Sun which generated the visible image we see, and the dark Sun that pulls us forward) we will see or experience in the future.

In other words (please refer to the diagram of Fig. 3, which differs from the classical Bradley aberration diagram), if we place ourselves (ie the Earth at E_0) at any given t=0 seconds, the Sun we see (Visible Image at C_0) is old by 8.32 minutes (or 499.12 seconds for ~20.47 arc seconds), whereas the pull we feel (as Earth at E_0) comes from a Sun that we shall only see in 498.08 seconds (at position C_1 , when we will be at position E_2), ie 20.42 arc seconds to the East of the Sun we actually see at t=0. The Sun we shall also see at 8.32 minutes from now (at position C2, when we will be at position E_3) is the Sun that received our (ie the Earth's) pull on it when we were at t=0 (the pull from the Earth on the Sun being arbitrarily emitted at t=0, as if it were a "reflected ray"), 8.32 minutes back from when that Sun will be sighted. The Sun that pulls us forward, in a gravitational sense, is invisible at t=0, and lies, by Bradley's constant aberration, 20.42 arc seconds to the East of the Sun we see at t=0. But if we could see (ambipolarly) the dark image of the Sun that pulled us gravitationally at t=0, and this dark image was transmitted ambipolarly across physical Space and Time, we would only see it a mere 42.4 seconds later, at t=42.4 sec (when we would be at E_1) as a Sun positioned at C_1 , which means a Sun positioned where it gravitationally pulled us at t=0. Since the "dark image" caused by transmission of the ambipolar radiation is *invisible*, there are not two images of the Sun in our sky; but if there were, the 'dark image' would therefore appear at t=42.4 sec (when the Earth is at E_1), 18.68 arc seconds to the East of the visible Sun at that time. This dark image would only become a visible image (at C_1) 455.68 seconds later (when we would be at E_2).

The constant of aberration was discovered by J. Bradley in 1728; he gave its value as 20.47 arc-seconds and determined from this that the velocity of light was ~10⁴ faster than that of the translating Earth, and that it would take light 8.217 minutes to travel from the Sun to the Earth ^[99]. The accepted determination is 8.32 minutes, ie 499.25 seconds - or, still, 20.47 arc seconds. However, that does not give the exact position of the Sun responsible for the pull on Earth that we feel at t=0 - the correct time value for this is 1.169 seconds earlier, at 8.3 minutes, or 498.08 seconds (20.42 arc seconds), *since the force of gravity takes 1.169 seconds to propagate at the finite aetherometric speed* v_G (see below) from the Sun at C₁ to the Earth at E₀ (see Fig. 3). The aetherometric relations are contrasted to the classical ones in Tables 1 and 2. These relations follow from the published aetherometric wave speed W_{vS} = c $\sqrt{\alpha^{-1}}$ of massfree ambipolar radiation emitted by the Sun ^[90], and from the aetherometric theory of propagation of the force of gravity (see below) implicit to the micro-physical treatment of the cosmological function of G ^[35].

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According to the aetherometric treatment, it is not correct to suppose - as is traditionally upheld - that the Bradley aberration is independent from the star's (or 'light emitter') velocity. The star's velocity may be negligible - as in the case of the Sun - but not necessarily so. Indeed, the aetherometric treatment demonstrates how the Bradley aberration is a variant of the electromagnetic Doppler effect - with respect to both frequency and relative velocity between the Sun and Earth where the effect is transverse to the 'co-parallel' motions of the source (Sun) and the receiver (Earth). The mistake of SR was, in this respect, to ignore the star's velocity, as the traditional treatment of the Bradley aberration had also done. However, had the Bradley aberration been properly understood as the Doppler effect of a combined motion having a direction transverse to the propagation of light, there would have been little reason to suppose that the MM 1887 experiment would detect the motion of the Earth around the Sun as a second order effect of v/c, when the Bradley aberration already detected that motion as a first order transverse effect of v/c or, more properly, as a function of:

$$v_i / c = (v_{ETL} - v_{dS}) / c$$
 (595)

A. Berry noted in 1898 that Bradley's discovery could only have been possible by the notion that light was a material corpuscular substance shot out from the Sun - and this is an important hint to the aetherometrist who seeks to understand the relation between the *apparent* propagation of light (ie photon production, really) arising from the gravity-dependent motion of massbound leptons present along the 'transmission pathway' versus the actual propagation of gravity-independent massfree ambipolar radiation (the indirect light-producing stimulus). For the Sun is a source of ambipolar radiation, but also a source of high-energy electron and proton plasmas; the ambipolar radiation does not travel entirely unhindered from the Sun to the planets - it interacts with the formed and ejected electron plasmas, in particular those travelling at the so-called relativistic speed and responsible for 'synchrotron radiation', as it constitutes the very source of their local acceleration; it interacts with the cosmological electrons of the Space and Time matrix, and as well with the absorbing atmosphere of a planet. Photons do not propagate - they are generated *in situ* upon *deceleration* of that electron plasma (likewise for the heavier proton and helion plasmas), their 'light intensity' or frequency being proportional to that deceleration, ie to the velocities and the densities of the incident stream and of the decelerating Matter (or, just the same, proportional to the local gravitational field decelerating that Matter - see our commentary in section 1.8 above regarding a physical redshift distinct from Doppler light shifts). In other words, apparent propagation of the visible image of the star is slowed down from the ambipolar wave velocity (ie from the propagation of the *dark image*) - fundamentally by the kinetic intermediacy of electron plasmas - to the near-uniform and effectively retarded speed c of the composite 'photon rays'. It is in this very sense that light emitted from a massbound particle effectively shares the state(s) of motion of that particle while remaining invariant in speed with respect to the inertial frame of that particle (note therefore that, aetherometrically, the lightspeed will only remain invariant for a receiver if the latter shares the state(s) of motion of the emitter). All happens, therefore, as if the distance to be travelled by the ambipolar radiation of speed approximately given by $W_{vS} = c \sqrt{\alpha^{-1}}$ were longer than the radial distance R_{ETL} (see Fig. 3 and Tables 1 & 2) according to:

$$R_{amb} = \{R_{ETL}^{2} + [([E_2 E_o] - [E_1 E_o]) - ([C_1 C_o] - [C_0' C_o])]^2\}^{0.5}$$
(596)

Likewise, the radial distance over which the force of gravity is transmitted between Earth and Sun is longer than the radial distance R_{ETL} :

$$R_{G} = [C_{1}E_{o}] = [R_{ETL}^{2} + ([E_{2}E_{o}] - [C_{1}C_{o}])^{2}]^{0.5} \approx [R_{ETL}^{2} + (\wp_{1} - \wp_{2})^{2}]^{0.5}$$
(597)

4) Undoubtedly there is mediation in the propagation of gravitational energy. Instantaneous gravitational action is worse than a misnomer: it is a placeholder. The action of the gravity field at once takes time and requires 'causation'. If it is to 'act at a distance', even through a 'vacuum', it cannot be instantaneous any more than it can be unmediated. Newton argued this very point only to settle for an infinite speed - and that would be the empty meaning of 'instantaneous'. The history of science is filled with these hegelian solutions or 'superations' that leave the old essentially untouched (the recurrence of the old fad).

But what propagates to convey the apparent force of gravity acting along the vector of socalled field intensity is neither the graviton nor ambipolar radiation - nor, *a fortiori*, the photon. Apparent (secondary) gravity is the side product of the differential speed relation between the velocity of two frames which, in pre-aetherometric nomenclature, were called electromagnetic and gravitational. More properly speaking, these are two frames of massfree energy that can be called secondary because they are associated with Matter or the interactions of Matter: one, *photoinertial*, defined by all the electromagnetic and inertial interactions of massbound particles with *both fields and other particles*, whether massfree or massbound; the other *gravitic*, defined by all the gravitational interactions, primary and secondary, of all massbound particles.

Electric field acceleration of massbound particles under conditions that produce inertial effects is not yet an electromagnetic interaction. However, blackbody photon production ultimately depends upon the interaction of ambipolar fields with the 'rest energy' of massbound particles - specifically upon the shedding of their kinetic energy, or their 'inertial deceleration' so to speak. Indeed, emission of photons is always referenced - by nature! - to the inertial frame of the rest-mass

of the massbound particle that decelerates, that 'emits'. It could not be otherwise, since the photon is emitted by eg an electron, and must therefore share the state of motion of that electron; hence, for the inertial frame of that electron, c will always be a constant; and so it will be for any other inertial frame of reference that will share the same state of motion of *that* electron. But it will not be so - and this is the general mistake of all belated theories of relativity, SR included - for any other inertial frame engaged in a different state of motion, one not shared with that electron. It is here that the Doppler effects - for they are a multiplicity that has been poorly studied and grasped - come into play, again without any imaginary need for Lorentzian transformations. It is still with respect to the photoinertial frame that all particle production, beginning with ordinary pair production takes place. It is the frame of reference for all the electric and electromagnetic interactions of Matter, or massbound particles: interactions with (1) electric or electromagnetic fields, whether massfree energy fields (ambipolar or photonic) or (electric) fields formed by other massbound particles, and with (2) other massbound particles (whether in currents or plasmas, or in collisions, etc).

The gravitic frame, conversely, exists in a relationship of phase-energy superimposition with the inertial frame. It addresses not the photoinertial properties of Matter, but the gravitational reaction of the massfree Aether to Matter, to the 'presence' of massbearing particles having defined values of mass-energy or 'rest energy'. It encompasses, therefore, not only the primary gravitic interactions of every particle of Matter with the surrounding massfree Aether lattice (see below), but also the secondary gravitational effects - those responsible for (1) mutual satellization of coordinated motion in space (so-called gravitation), and for (2) the local effect of weight upon massbound particles - in the form of a constant massfree energy "pressure" (the massfree graviton momentum) exerted upon the 'rest energy' of massbound particles by the local Aether lattice.

These two energy frames - one containing Light and Matter (photons and electrons, protons, etc) and the other containing massfree gravitons - are but the byproducts of the superimposition of massfree 'latent energy'. When we write, as we did above -

START END

$$8\alpha^{-2} E_{\alpha e}^{3} = 2 [E_{\delta e} E_{G e} (\alpha^{-2}h \upsilon_{CBR})]$$
(598)

we are already presenting precisely that fact, namely, that there exists an energy balance between the 'formless' massfree Aether, or latent energy $(E_{\alpha e}{}^3)$, on one hand, and on the other, the mass-energy of the electron $(E_{\delta e})$, the graviton of the electron (E_{Ge}) and the associated photon blackbody that is responsible for the mCBR $(\alpha^{-2}h\nu_{CBR})$. So, all that the student of Aetherometry needs to further keep in mind is that the photon blackbody term simply stands for the occluded kinetic energy term of the electron (E_{keCBR}) , and that, in turn, this kinetic energy term simply stands for the occluded ambipolar radiation released from the massfree Aether continuum, so that we can isolate distinct phases of the cosmological process, and write their exact equation - for example for a segment of the process:

$$4\alpha^{-2} E_{\alpha e} \implies E_{CBOR} \implies E_{keCBR} \implies \alpha^{-2}h\upsilon_{CBR}$$
(599)

The entire process is what we have termed a secondary superimposition process; essentially, it requires energy superimposition in complex Phase Space and Phase Time. Fundamentally, the superimposition of these two frames involves a permanent counterflow between gravitons and photoinertial elements, whether photons or elementary mass-energy units (leptons, baryons, etc). All happens as if the two frames were under a counteracceleration, or better, a differential acceleration by the same cosmological matrix. Remember, the ultimate reality of the two frames is massfree energy - *gravitons* lasting for as long as there is mass-energy to impact (ie transfer momentum to) and *photons* as punctual productions that are constantly absorbed back to the massfree energy continuum. Since all of this happens in so-called 'empty Space' under the action of the permanent motion of the fundamental continuum, the very structure of Space and Time already contains the relationship between these frames that permits the propagation of the apparent force of gravity as a cosmological function. We have formally shown this in a previous communication ^[35]. Specifically, the velocity of propagation of the apparent force of gravity v_G is a function of the speed differential between the speed of light and the speed of the electron-graviton, W_{Ge}:

$$v_G = (c/W_{Ge}) \text{ m sec}^{-1} = 426.95 \text{ c} = c \text{ f}_e/1 \text{ m sec}^{-2} = c \text{ f}_e/(\lambda_e \text{ f}_e^{-2}) = 1.2799^*10^{11} \text{ m sec}^{-1}$$
(515)

This is extracted directly from one of the aetherometric equations ^[35] for the cosmological function of G, when expressed ('inertially') with respect to the superimposition of electron mass-energies - as a consequence of the fact that the matrix of Space and Time fundamentally generates leptons, each with mass-energy $E_{\delta e} = m_e c^2$:

$$G = (h/E_{\delta e})^2 (\alpha \text{ m sec}^{-2}/2\pi)^2 (c/W_{Ge}) =$$

= $(e \lambda_x/m_e c^2)^2 (\alpha \text{ m sec}^{-2}/2\pi)^2 (c 426.95)/1 \text{ m sec}^{-1} =$
= $(e \lambda_x/m_e c^2)^2 (\alpha \text{ m sec}^{-2}/2\pi)^2 v_G/1 \text{ m sec}^{-1}$ (519)

We can also aetherometrically express G as a function of the superimposition of protons with mass m_p (we employ the term here in the generic sense, whether the interaction is proton-proton, proton-antiproton or antiproton-antiproton), and this immediately illustrates *how the lepton interaction is the more fundamental one* (look at the mass coefficients):

$$G = (h/E_{\delta p})^2 (\alpha \text{ m sec}^{-2}/2\pi)^2 (v_G/W_{Gp}^2) (m_e^2/m_p^2) = \int = \int [e \lambda_x/m_p c^2)^2 (\alpha \text{ m sec}^{-2}/2\pi)^2 (v_G/W_{Gp}^2) (\lambda_e^2/\lambda_p^2)$$
(600)

Hence, we write for the apparent velocity of propagation of the force of gravity:

$$v_{G} = (G \text{ m sec}^{-1}) / [(h/E_{\delta e})^{2} (\alpha \text{ m sec}^{-2}/2\pi)^{2}] = (G \text{ m sec}^{-1}) / [(\upsilon_{\delta e})^{-2} (\alpha \text{ m sec}^{-2}/2\pi)^{2}]$$
(601)

where $v_{\delta e} = 1.2355^*10^{20} \text{ sec}^{-1}$ is the Compton-electron frequency (see below). Clearly, there is no occasion to confuse the constant propagation velocity v_G of apparent gravity with the variable velocity of gravitons, or the velocity of the fundamental electron-graviton. Graviton speeds are very slow, much slower than c - and thus quite unlike the gravity propagation velocity v_G . This clearly establishes how gravitational radiation does not propagate at luminal speeds, and indeed possesses a wavefunction rather distinct from the propagation of the force of gravity. *Neither does the force of gravity propagate instantaneously, nor do gravity waves or gravitons propagate at* c. It is an entire epoch of deranged physicists that is deeply wrong on both counts. It can thank Lorentz and Einstein for it.

5) When van Flandern seeks to resolve the problem of the gravity propagation velocity v_G , he proposes to distinguish between sources of gravity that induce gravitational changes in "nearby spacetime" and induce acceleration in other bodies, and gravitational waves from "targets of gravity" that result from being accelerated by these sources. But this problem is from the outset badly posed, in that it already vitiates its solution: the function for the universal force G that yields the function for weight as a force, is not a function of mass alone, nor one that really arises in a straight line between the centers of mass of two gravitating bodies, one of which is 'the source' of the field. Rather, it is an action seated in the intervening cosmic space that primarily acts along the arc of motion of each of the bodies, along a distance gradient, and it acts above all upon the kinetic energy of the moving mass ^[29]. In other words, the universal cosmological function of G arises from the near-isotropic mass and energy distribution of the lepton-creating Aether matrix of Space and Time. It is the interaction with this matrix that induces the gravitational motion of any and every body. It is only secondarily, as a function of the proximity of other significantly large masses with their anisotropic distribution, that it is possible to understand satellization as a reciprocal gravitational action between neighbouring masses that is mediated by the primary interaction.

For the traditional view to hold, gravitation must be seen as the result of a force that acts in a direct line between masses treated as points on a surface and not necessarily in motion. But AToS teaches that rest itself is a form of motion - and that, in fact, there is no body which can be said to be at rest - everything is in motion. What one means by reference to a photoinertial frame is nothing but a phenomenological reference to a state of rest which abstracts from forms of motion that are not inertial. And why is everything in motion? Simply because the matrix of Space and Time, the massfree continuum - that indefinitely reforms the universe at once as both a nonlocal and a local event - is in permanent motion that it communicates to all Matter as a constant acceleration. Then, the satellization between masses is a mere consequence of this fundamental cosmic acceleration of all Matter, when to the fundamental constraint is added another superimposition - that of the coordinated motions (and kinetic energies of motion) of two bodies of Matter, or secondary gravitation. In the latter case, Newton's case, the apparent gravitational field may well appear to act along as close to a straight line as possible - such that at very short distances we can assume gravity acts along the vertical - and it is in this way that we can extract the vertical component of the acceleration one calls the local field intensity. Yet, the real weight or force function of such satellized (or secondary) gravitation only exists as a real force for a forward point whenever, on a planar projection, the paths of the two bodies meet, not their masses. Reich was the first to draw attention to this fact [100], emphasizing that mutually gravitating bodies obeyed the wavefunctions of the co-ordinated cosmic energy streams they were riding on - the celestial bodies being constantly buffeted by these streams. More importantly still, that the real force function implies that the two bodies be in coordinated, superimposed motion in volume-Space, such that weight, as a force, already requires angular motion - motion with respect to one another, but also of each, or the couple, with respect to the motion of that matrix of Space and Time. Put simply and in geometric terms - it is far from established that the horizontal or so-called transverse components of velocity, acceleration or force in a local gravitational field play no role, as required by the cosine modification of the angle to the vertical. Indeed, we must be reminded that the paths meet only on the planar projection.

When one says that the weight of a body is a function of the superimposition of masses and inversely proportional to the square of their distance ($F_g = G \text{ mM/R}^2$), and thus arrives at the net acceleration \mathcal{E} of the field, one is already resolving the superimposition of two distinct transverse accelerations where each body relates to that cosmic matrix by:

$$a_1 = G M/R^2$$
 (439)

and

$$a_2 = G m/R^2$$
 (440)

It is not the masses that pull towards each other (that is, apparent gravity), it is the coordination of the two distinct and mutual (secondary) accelerations - in what Reich called convergent paths - that generates the apparent force of gravity along their distance R, and in the *net* direction of the local attractor.

In other words, both bodies are sources of gravity with respect to the other ^[101], as if each intrinsically focused the accelerating action of the cosmic matrix, or compressed it (one could, in this way, think of mass as nothing other than a gravitational lens, or as a sink or hole for gravitons constantly emitted or stripped from that matrix). Whichever body has a greater intrinsic acceleration *with respect to the other* (hence the relationism of the superimposition) defines the net direction of the field intensity \mathcal{E} , and given that G and R are constants, the magnitude of the acceleration depends entirely on the masses M and m. If M>m, the resultant or apparent field will be directed to M. Thus we can write for the superimposition of the primary forces (MGM/R² and mGm/R²) that yields the weight function:

$$F_g = \sqrt{[M(G M/R^2) * m(G m/R^2)]} = (G^{0.5} M/R) (G^{0.5} m/R) = G mM/R^2 = m \mathcal{E}$$

(602, but see 441)

where $\mathcal{E} = GM/R^2$, and the force of weight only depends on the quantity of inert mass m.

6) Lastly, even though it is not here we wish to present this matter at length, our work with AToS has identified the motion towards the Solar Apex as compliant with Kepler's Law (K-compliant) ^[102]. In fact, as is well known, if the center of the solar system is treated as being at rest, the sun moves on the ecliptic relative to this center (the Galilean and Copernican theories of heliocentrism ignored this motion by placing the Sun at the center of gravity of the solar system), 'orbiting' around it such that the distance between the center of mass of the Sun and the gravity center of the solar system is thought to be of a magnitude comparable to, or on the same order of, the Sun's diameter. This is often referred to as the barycenter disturbance, and the cause of the solar displacement towards the winter solstice responsible for elliptical eccentricity, with an apparent velocity aetherometrically placed at 89 m sec⁻¹, as shown in Fig. 3 and discussed above in the context of the Bradley aberration. Its mean aetherometric displacement is basically two solar diameters. The barycenter disturbance appears to constitute, for all effects and purposes, a translatory motion of the Sun nearly on the plane of the ecliptic. But, in fact, it is a byproduct of, or an apparent motion caused by, the corkscrew motion of the Sun and the solar system towards the Solar Apex and transversely to the ecliptic, as this
motion is projected onto the plane of the ecliptic. Its K-compliant period is the 'true solar year' coincident with the periodic cycle of sunspot activity, and the mean velocity is 13.55 km sec⁻¹, not the accepted 19-23 km sec⁻¹. Elsewhere we shall present these real and apparent motions in detail ^[102], but it suffices to say here that W. Reich had already noted the existence of a K-compliant solar motion (by reference to the time period) in mathematical notes that remained undeciphered by his supposed followers. There is no evidence, however, that he successfully identified either its velocity (speed and direction) or its true radius.

The understanding of the barycentric disturbance on the plane of the ecliptic as being caused by the 'partial corkscrew' motion towards the Solar Apex permits us to fully grasp Reich's contention that it is not simply the planets which turn around the Sun, but also the Sun that turns around the planets. The motion of the solar system is not circular, elliptic or even ellipsoidal - it is vortical. Moreover, there is further vortical motion superimposed on the motion towards the Solar Apex, and one example is the galactic translation of the solar system.

These fundamental physico-mathematical facts suffice to establish the superiority of the aetherometric method as a scientific and analytical approach, over accepted physics. AToS permits direct determination, from first principles, of the multiplicity of actions (primary and secondary) that are interlocked into a system such as the Solar one, and the explanation of G as both a macro and a micro force constant. There are no metaphysical constraints - no infinite speeds, no 'geometric instantaneities' designed to suppress inquiry, no arbitrary speed limits, no required relativistic transformations. Limits belong to their domains and do not extravasate into other domains - the light speed c is a constitutive limit for mass-energy and the production of photons, ie for all electromagnetic or photoinertial frames; it is not a limit for the displacement of any energy save electromagnetic energy; it does not and cannot apply to gravitation or ambipolar radiation or to the electric structure of mass-energy. The continuum of massfree energy can be referenced (because of its fundamental near-isotropy) by its cosmological generation of leptons - and if we do so, it is apparent that the force of gravity has an apparent propagation constant, and thus a finite speed. This is not a limit to motion, but an absolute speed of propagation for the effects of a force that is cosmologically generated for every body of Matter even, and above all, outside of its relationship towards another body of Matter, as a sign that all Matter - even that phenomenologically at rest on its inertial frame - is everywhere in permanent motion.

"Sciama adds [to the scalar potential] a vector potential, one and the other defined by the same integrals as the corresponding potentials in electromagnetism, gravitational mass taking on the role of the electric charge. The gravitational field thus becomes a 'gravielectric' field (to underline the formal analogy) just as is added to it a 'gravimagnetic' field fundamentally manifested by its [magnetic] effect upon rotation."

J. Merleau-Ponty, XXth Century Cosmology

4. Delusions of an electromagnetic Aether

4.1 Geometrodynamics and the classical ZPE

Stochastic electrodynamics (Marshall, Boyer, Sciama, etc ^[103-105] proposed an approach - alternative to quantum-electrodynamics and quantum-relativity - to the problem of the 'vacuum-state'. It suggested that the vacuum is composed by a universal random classical electromagnetic field that would exist even at or near absolute zero temperature and is accordingly termed the zero-point field (ZPF). Thermal effects of acceleration in the vacuum would have their source in the fluctuations of the ZPF without requiring the creation of particle pairs ^[106]. 'Originally' (at the mythical origin of the universe), the ZPF was distorted by gravitational fields. This was consistent with the notion that the ZPF formed a 'free field' implicit to the passive boundary conditions of the universe, much as the microwave CBR was seen as the residual marker of the mythical Big Bang. But later proposals suggested that the ZPF and its energy spectrum would be generated by the motion of charged particles throughout the universe ^[107]. Puthoff formalized this by suggesting that the ZPF spectrum drives particle motion, and in turn particle motion generates the ZPF, as "the 'bottom rung' vacuum state in which further ZPF interaction simply reproduces the existing state on a dynamic equilibrium basis" ^[108]. Puthoff further suggested that the spectral energy density of this ZPF energy varies as the cube of the 'Planck frequency' ω , giving the (volumetric) spectral energy density as:

$$(\hbar \,\omega^3/2\pi^2 \,\mathrm{c}^3) \,d\omega \tag{603}$$

This, of course, is too simple - as that ω^3 term is artificially segregated by the partial derivative $d\omega$ - and furthermore meaningless if we are to abide by the Compton frequency function

$$v_{\delta e} = m_e c^2 / h = 1.2353^* 10^{20} cps$$
 (604)

as the limit frequency of the electromagnetic spectrum ^[109].

We have already seen why Aspden commented on the zero-point field models of 'vacuum'-

energy as a Lorentz invariant form of electromagnetic energy: "it fits too closely the Einstein mould and it accounts for failed attempts to explain inertia" ^[110]. This is a statement that we can regard as applying to the entirety of the geometrodynamic approach and its inheritance, especially with respect to theories of the ZPE. Following a suggestion of Sakharov systematized by Wheeler et al, Puthoff proposed that gravitational mass and gravitational interactions are an effect induced by "zero-point fluctuations" of the 'vacuum'-state. He suggests that the kinetic energy of the internal particle motion (the quantum jitter or *Zitterbewegung*) corresponds to the gravitational mass of the particle, while the 'attractive inverse square law force' of gravitation is treated as being "of a long-range retarded van der Waals type, associated with the broadspectrum ZPF ["zero-point fluctuations"] radiation fields generated by that same *Zitterbewegung* motion" ^[111].

Modern physics inherited the limits of classical electromagnetism - the bias that all energy is electromagnetic, that light consists of electromagnetic waves, that electrostatic interactions are not electrodynamic, etc - and never succeeded in getting itself rid of these dogmas; in fact, this classical inheritance typifies the failure of modern physics. It is equally typical of modern physics to have married this classical bias to the probabilistic and relativistic notions of a revised electromagnetic theory where the most glaring errors are now permitted as probable realities - such as the notion that Matter is composed of charged point-mass particles (partons, or what one should more properly call put-ons, or maybe *put-offs*), that its volume constitutes a probability wave, or that, as Aspden incisively comments, we should "expect the particle to [somehow] derive its inertial property from a background [of energy] that is nothing other than other particles" [112]! Neither the gravitational interaction, nor the physical function for gravitational mass or even inertia can be derived that way! Aspden is totally on track when he further adds: "No, the inertial nature of a particle has to be something intrinsic to that particle!" [112]. It is therefore scarcely surprising that ZPE theories seek to unify all physical energy manifestations and interactions by reducing them to a hybrid form of electromagnetism, and that, in order to do so, they resort to techniques that might have made the Bishop of Berkeley blush for their sheer solipsism.

And when all is said and done, all that ZPE theories can possibly have is Sakharov's opaque equation for G, from which they must depart, and at which they must arrive:

$$G = (\pi c^5 / \hbar \omega_c^2)$$
(605)

This might well give the correct value for G in both accepted and aetherometric Physics, but is nonetheless merely a relation that was 'hammered together'; Planck's quantum appears in it - but in the denominator, and not as part of any quantum electrodynamic or magnetodynamic function that even attempts to relate two particles together! For indeed, what does it mean to raise the uniform speed of the electromagnetic frame to the fifth power? Lovers, fools and pretenders - so says the poem

- and not to be faulted that they are all part of an infinite variation that tries. But also fails. If there is a quantum explanation or physical basis for gravity, the very expression of an invariant submicroscopic G function must already deploy the interaction of those Planckian quanta, much as every Law of Electrodynamics has attempted to do with charge - by considering, at the very least, a superimposition of two charge elements, static or dynamic; and it must also succeed in identifying what exactly it means by the fundamental term that assures the dependence of the Lorentz invariance of the ZPE spectrum upon the cube of this hypothetical Planck frequency, as per the relation:

$$(\hbar \,\omega^3/2\pi^2 \,\mathrm{c}^3) \,d\omega \tag{606}$$

After all, what is the physical meaning of the Planck frequency ω_c , at 43 orders of magnitude for beats per second?

4.2. The marketing of military-scientific interest in ZPF research

Ever since 1965, when Penzias and Wilson, at Bell Telephone Laboratories - a key division of AT&T and the military-industrial-scientific complex of the 1930's-1950's - discovered the mCBR, the study of the electromagnetic field of the vacuum has been of interest to those institutions of the 'complex' that are responsible for studying propulsion or thrust systems. Puthoff draws attention to the fact that at least since 1986, the USAF has been explicitly searching, in the public SBIR program, for "esoteric energy sources for propulsion including the zero point quantum dynamic energy of vacuum space" ^[113]. Our own interaction with the US Navy indicates that, nearly a decade later, the search was still on to test, not just devices compatible with ZPF theories, but also those suggested by a variety of alternative approaches to the conceptualization of the 'vacuum-state'.

This gives a measure of both the tragedy and the comedy of research within the militaryindustrial-scientific complex - that it can take so much courage to explore, academically, a slightly unorthodox theory, as formed by modern ZPF models. It would seem, however, like a safe proposal, since the chances that anything substantial - in terms of our scientific understanding - could result from the treatment of the cosmic background radiation offered up by Zero-Point Energy (ZPE) theories, and lead, to boot, to a better understanding of gravity, are strictly zero, no pun intended. In fact, this failure is implicit to both Boyer's theory of the mCBR and to Sakharov's theory of general relativistic phenomena as "effects brought about by changes in the quantum-fluctuation energy of the vacuum due to the presence of matter" ^[113]. And it is the extent to which these ZPE theories misunderstand the 'vacuum-state' that prevents them from grasping the concept of inertia, and thus from grasping how it comes about as a resistance to acceleration designed to conserve mass-energy: "Why, for example, should a measure of the resistance of a body to being accelerated, even if far from any gravitational field, have the same value that is associated with the gravitational attraction between

bodies?" [113]

Indeed, why should it? Precisely because the *fine structure* of mass-energy is *electrical*, and not electromagnetic. ZPE theories cannot grasp how inertia, that property of resistance to changes in motion which can be better conceptualized as a force, is a conservative force that preserves the massenergy of the particle (unlike the punctual, self-dissolving, noninertial or massfree photons, units of mass-energy are inertial). Neither can those theories grasp that gravitational energy exists in a frame of energy flux distinct from, and yet superimposed with, the photoinertial frame of Matter and 'Light' or 'Heat', and the gravitational frame of gravitons. In other words, these theories are reductionistic because they refuse to consider the mutual and actual irreducibility of gravitational and photoinertial (or electromagnetic) frames. They ignore, in fact, the physics and the mathematics of the articulation of these frames, precisely because of the *reductio ad absurdum* of all energy to electromagnetic energy. It is, therefore, of little astonishment to us that no possible consideration exists of a third frame, that of the massfree Aether, in all of its primary manifestations, electric and nonelectric, include antigravitational ones.

This provides one (and us) with the real dimension of present-day technological achievements with regard to controlling the gravitational field: they are null, since the electromagnetic frame itself is poorly understood - how could such theories ambition to explain that which is not even electromagnetic??

Furthermore, it also presents the truely paranoid dimension of the Disclosure Project's assertions and objectives: they are untenable; they are conjured up from the same well of mental projections that brought us religion, superstition and fanaticism. No black military-government research on Earth has the wherewithal - theoretical or, a fortiori, practical - to understand gravity, and even less antigravity. Such a gross error or paranoid crock simply ignores facts, as well as the limitations of the present-day scientific method and the real scientific challenges and technological difficulties that must be faced before any control of gravity may be achieved. Herein lies the Disclosure Project's greatest dupery - and nothing other than the purposes of self-aggrandizement or disinformation can provide a rational explanation for its concerted and persistent error. If it is an 'intelligence operation', real intelligence demands that the bluff be called or the project be killed. All it has is the allure of a new sci-fi religion. Is it conceivable that the military-industrial-scientific complex of any country, including the US, would have been searching, since the 1980's, for a ZPE propulsion system, and still not have found it - a decade later, or still another decade - if there was one to be found? And had there been one to be found, that the secret would not have long ago come out? (Just for reference compare this to what happened with the A bomb secret and Soviet penetration of the American and British scientific intelligence establishments!) And that the right equations (yes, aetherometric) have not been found?

Paranoiacs make one laugh, but they are not funny.

The scientific argument that supposedly buttresses the Disclosure Project was made, in essence, by Loder in his 2002 paper ^[114]. Loder sees T.T. Brown's work as the real departure point for the modern technology of electrogravitics (see the two previous monographs of the present AToS volume on the subject of T.T. Brown's work ^[115-116]), and the coupling of this to the more recent theories of Zero Point Energy (Puthoff, Bearden and colleagues, and a host of other minor sausage vendors) as the source of "a new understanding of both the nature of matter and gravity". He even goes as far as stating that "some evidence suggests that it has been understood for decades within the black project covert community".

What does aetherometric theory have to say about this? Well, it is simple - since few scientists appear to be capable or even willing to read and learn Aetherometry, its tools and the application of its method, it is most doubtful whether that 'new understanding' will grasp anything at all. Bearden himself is sorely aware of this - and he perceives correctly that a whole new language and methodology are on the horizon [117]. But Bearden's conceptualizations are no less physics run amok than the elucubrations of S. Hawking. For example, what could possibly be 'Time-energy', as distinct from 'Space-energy'? Such notions boggle the reasonable mind. Aetherometry exposes them for the nonsense they are. Accordingly, both established and alternative scientists (not to mention the mystical fringe of deranged missionaries, including the priests of the Ur-Aether) will try to resist, overtly and covertly, the wave of understanding that might permit formation of aetherometrists. It was curious, in this regard, how little Greer and Loder were interested in learning - from us - precisely the only knowledge that will ever permit human beings to have a 'contact with Space' in a different way. Fixated as they were on the ZPE, they mistook the rivulet for the sea. For what is Zero Point Energy? There is no infinite virtuality of electromagnetic particles or photons, with energy densities a la Wheeler, in the 'vacuum of Space'. The electromagnetic field or 'energy frame' misnamed ZPE constitutes solely a thermal bath, a minimum of sensible radiant heat that is present everywhere throughout abstract space and which does not permit the attainment of absolute zero degree kelvin of temperature (zero temperature). What that heat is, how it gets there and where it comes from these are the questions that ZPE physicists cannot answer, but should be striving to answer. However, since this task alone would require the abandonment of Relativity - as well as of Quantum Mechanics and Electrodynamics as they stand today - our ZPE physicists will never manage to achieve anything besides illusions at worst, and oxymorons at best. Yet, without knowing the answers to these questions, our theoreticians have gone on to solve the mysteries of inertia, gravitation and mass... No wonder they come up with notions such as a constant contribution of the ZPE to the orbital motion of electrons, a dignified absurdity that compensates for their belief that valence electrons are constantly radiating their energy, or do so while being accelerated.

What is appalling is that these people never question the most abstruse tenets of Relativity, and simply have not even bothered to read Aspden's succinct demonstration that massbound charges

only radiate their kinetic energy when undergoing deceleration, not acceleration! They talk of dynamic equilibrium, but it has a hollow ring - because, very simply, they do not exactly know what *it* is *that equilibrates*.

4.3. Aetherometric critique of ZPE theories and submicroscopic solution to G

We will presently summarize the fundamentals of the manifestation of inertia under acceleration in order for the reader to understand us and not make a mistake worse still than that of ZPE theorists (we shall return to this topic in the following monograph, and do so there in greater detail). For all that ZPE theories may be able to encompass is the notion that all energy is electromagnetic. There is already a precocious identification between the law of quanta and electromagnetic energy that these theories require, as if (1) no electric charge could be anything but material, ponderable, massbound, monopolar; (2) the only form of massfree energy were the photon (and even the notion that the photon is a massfree energy particle is barely mentioned or understood ^[31]); and (3) the fundamental fields were electromagnetic in nature. Ultimately the refuge of this premature identification is some form of a '*wavicle*' theory - since it only recognizes electromagnetic energy and absurdly proposes that, depending upon frequency, this energy may exhibit either wave or particle (quantum) behavior. It is so strong an identification that it never occurs to physicists that no energy unit exists which is not simultaneously composed of 'waves and a particle', whether massfree or massbound anymore than it occurs to them that electric charges may also come in massfree ambipolar variety; that massfree electric fields may in fact exist which will not require any overall monopolar electric unbalance.

Be that as it may, had the ZPE theoreticians *carefully read* Aspden's model for the function of inertia in a charge accelerated by an applied electric field, they would have easily realized that inertia qua resistance to acceleration is simply a manifestation of the conservation of the mass-energy of the accelerated massbound charge. In the aetherometric theory of electrodynamics we go further: this conservation imposes a limit upon the kinetic energy which a massbound charge can associate with its own, or constitutive, mass-energy. This is the deeper reason for the observed phenomenology of the Bertozzi-type experiments: *that there is a growing disproportionation between the field energy inducing the charge acceleration and the kinetic energy absorbed by the charge as its effective energy of motion*. This is a totally original perspective characteristic of Aetherometry, which was foreshadowed by the Autodynamics theory of Carezani. In essence, inertia - whether electrical or mechanical - is a conservative property of mass-energy.

But the misunderstanding and the limitations of ZPE theories do not begin or end here; they also carry the load of all the errors associated with the Bohr model of the atom. And it had to be Aetherometry which provided the solution here also: there is no 'planet-electron', anymore than there is a Dirac point-particle made up of the lone dimension mass, turning around the 'solar nucleus'.

Thus, there are no orbitals, whether probabilistic or otherwise (the bias already underlies the description). Electrons are toroidal structures capable of expansion and contraction and in permanent closed-loop flux ^[30,32]. Their magnetic wave function directly dictates the spin of the whole torus around an atomic nucleus, or around their own virtual center of inertial mass. But one should not confuse this magnetic motion (a single motion being described by a single wave function) that is constitutive of the mass-energy of the electron with some orbital function nor, what is much worse, with the kinetic energy this torus might acquire that could sphericize its motion (tumbling of the torus along any axis through its structure) or make it spin like a disc.

All these elements are and remain confused, because Bohr's model precluded the tools needed to dissect the fine energy structure and the subnano geometry of the electron. Hence, we're left with Haisch et al's explanations that smack not only of Relativity and mysticism, but worse still, of eternal confusion as to which of these levels of motion it refers when speaking of 'the gyroscopic motion that slows down upon charge acceleration'. It is curious that Haisch came up with this notion in the same time frame in which we discovered that no Lorentz transformation is required to explain the phenomenology of Bertozzi-type experiments ^[33]. However, whereas Haisch kept the relativistic transformations, our aetherometric model directly demonstrates that what slows down is precisely the magnetic wave function internal to the mass-energy of the massbound charge. It is, in fact, internal to both the structure of the massbound charge and the mass-energy of the charge carrier. There is no electromagnetic barrier to the magnetic motion of the massbound charge; rather, there is conservation of mass-energy that increasingly resists associating with kinetic energy, as the magnitude of this kinetic energy approaches the magnitude of that mass-energy. So, the expedient of which inertia or conservation of mass-energy avails itself to incrementally resist acceleration is the slowing down of the internal or constitutive magnetic motion of the charge. There is, therefore, no increase in actual iner*tial mass with velocity*. Once again, an entire epoch is wrong.

It is with disarming simplicity that, as we have shown in one of the accompanying papers, AToS presents a strictly functional solution to both quantum gravity and the underlying electrodynamic interaction. This solution demonstrates the irreducibility of the gravitational interaction to merely the kinetic energy of the mass-bearing particles forming the electromagnetic field (ie the local photoinertial frame), and expresses it either as a function of the fundamental aether electron-element [35, 37], ie the 'latent massfree energy' element E_{cre} -

$$G = (\hbar^2 a^2 / E_{\alpha e}^2) (W_{Ge}/c)$$
(513)

or, alternatively, as a function of the aetherometrically-identified (ie based on pendulum studies) electron-graviton of energy E_{Ge} ^[30, 37], directly involving its occluded inverse-square-ratio force expressed for the universal constant G as a function of the square of the mass-equivalent wavelength

 λ_e of the electron (much as if nature used λ_e as a measuring yardstick):

$$G = (\hbar^2 a^2 / E_{Ge}^2) (W_{Ge}^3 / c^3) = (\hbar^2 a^2 / W_{Ge} c^3) (1 / \lambda_e^2)$$
(517)

where the fundamental function for the universal cosmic acceleration, elegantly identified by Aetherometry (AToS), is simply:

$$\mathbf{a} = \alpha \text{ m sec}^{-2} = (\lambda_x \lambda_e f_e^4)^{0.5}$$
 (509-510)

The very proof that the electromagnetic energy (delimited by the condition c^2) does not constitute the sole frame of reference in nature, and that, at the limit, it coexists with a frame of massfree defined aether by the wave superimposition energy property $v = (W_{Ge}^* c)^{0.5}$, exposes the mathematization error that led to that postulate of the 'absolute rule' of the Planck frequency in the world of energy. It also led to all the other nonsense - since the gravitational field is itself epiphenomenological (just as the photoinertial field of mass-energy is), and itself in correspondence, both energetic and undulatory, with the superimposition of massfree Aether energy that sustains Matter and its associated gravitational energy. For the electron, we have the fundamental aetherometric function for secondary superimposition, which we have already presented above in section 1:

$$E_{\alpha e}^{2} = E_{Ge} * E_{\delta e} = (m_{e} c^{2}) (\lambda_{e}^{2} f_{e}^{3}) = \int = (\lambda_{e} c^{2}) (\lambda_{e}^{3} f_{e}^{2})$$
(224)

For the wave functions involved, we can formally write:

$$(W_{Ge}^*c)^2 = (W_{Ge}^2) (c^2)$$
(607)

where $W_{Ge} = \lambda_e f_e$.

The reader should note how the superimposition in the aetherometric function G above is directly one of quantum elements \hbar^2 , which may relate to photon energies, as per E = h υ , or may alternatively relate to massbound charges, eg electrons, as per both the photoinertial and electric relations, expressed aetherometrically as [33, 118]:

$$\mathbf{h} = \mathbf{p}_{\mathrm{Ae}} \,\lambda_{\mathrm{ce}} = \mathbf{p}_{\mathrm{e}} \,\lambda_{\mathrm{x}} \tag{608}$$

where λ_{ce} is the Compton-electron wavelength and λ_x the Duane-Hunt wavelength that we have identified ^[118].

Accordingly, we can bring to light the occluded charge interaction implicit to the gravitational force constant, as the basic embodiment of the fundamental inverse square law force:

$$G = (\mathbf{p}_e^2 \,\lambda_x^2 / \lambda_e^2) \,(\mathbf{a}^2 / 4 \,\pi^2 \,\mathbb{W}_{Ge} \,c^3) = \int = (e^2 / m_e^2) \,(\lambda_x^2 \,\mathbf{a}^2 / 4 \,\pi^2 \,\mathbb{W}_{Ge} \,c^3)$$
(519)

or -

$$G = (\mathbf{p}_e^2 \,\lambda_x^2 \,\mathbf{a}^2 / 4 \,\pi^2 \,E_{Ge}^2) \,(W_{Ge}^3 / c^3) \tag{609}$$

This formally demonstrates that we can only arrive at the notion of a 'Planckian frequency' (of the supposed ZPE, or a false Aether) by abstracting precisely from the existence of non-Planckian gravitons (eg E_{Ge}), as much as from the superimposition of Planckian quanta, electromagnetic or photoinertial, that subtends a hidden electrodynamic interaction. It is also a stark confirmation of the existence of a domain of phase Space and phase Time where both the gravitational and photoinertial fields, or their energetic realities, $E_{\mbox{Ge}}$ and $E_{\mbox{\deltae}},$ exist as codependent frames, and a domain $(E_{\alpha e}^{2})$ where only the superimposed Aether energy exists in its quality of massfree energy from which the other energy forms arise, to which they ultimately devolve, and with which they are in balance. fundamental cosmological The very existence of a acceleration a predicted upon conventional considerations of the spectral distribution of the ZPE (with reference to the aetherometric function for G presented above. in section 1: $[G = (h^2 / E_{\delta e} h v_{CBR}) (\alpha \text{ m sec}^{-2}/\pi)^2])$ is the simple sign that the cosmic function for G is submicrosocopic and responsible for the constant cosmological acceleration of all Matter.

Note, also, that when the electron-graviton is isolated as a reference energy invariant, the full physical sense of that cubed electromagnetic wavespeed c (as in equations #517, 519 and 609 above) is now seen not only with respect to the three-dimensionality of the Space manifold, the volume of energy in the photoinertial frame, but in a differential relation to the same volumetric dimensionality of the gravitational frame, as expressed with respect to gravitational wave speeds, specifically that of the electron-graviton, W_{Ge} (with reference to the expression: $[G = (\hbar^2 a^2/E_{Ge}^2) (W_{Ge}^3/c^3)]$). There is therefore no necessity to invoke terms with c to the fifth power; and neither can reference to c or c^2 account for the physical manifestations of energy in the gravitational or the massfree energy frames, since neither of these two frames is electromagnetic.

That these functions for G, and the related functions for F_g , are strictly an aetherometric discovery is further underlined by the simple treatment of the force of gravitational attraction ('weight', F_g) by two light leptons in 'deep space', containing implicitly the core of the aetherometric treatment of gravitational interactions formulated *independently of mass*, and as a function of the inverse square law:

$$F_{g} = (e^{2} \lambda_{x}^{2} a^{2}/m_{e}^{2} 4 \pi^{2} W_{Ge} c^{3}) (m_{e1} m_{e2}/r^{2}) = \int = \int [e^{2} \lambda_{x}^{2} a^{2}/4 \pi^{2} W_{Ge} c^{3}) (\lambda_{e1} \lambda_{e2}/\lambda_{e}^{2} r^{2}) = \\ = (\mathbf{p}_{e}^{2} \lambda_{x}^{2} a^{2}/4 \pi^{2} W_{Ge} c^{3})/r^{2} = (\hbar^{2} a^{2}/W_{Ge} c^{3})/r^{2}$$
(546)

And to emphasize the dual frame relation we have been discussing - the photoinertial and gravitational frames on one hand, and the massfree nonelectric or 'latent energy' Aether ($E_{\alpha e}$) on the other - we can write the gravitational force between two electrons in 'deep space' as:

$$F_{g} = (\hbar^{2} a^{2} / \lambda_{e}^{2} W_{Ge} c^{3}) (\lambda_{e}^{2} / r^{2}) = (\hbar^{2} a^{2} / E_{\alpha e} * E_{\delta e}) (\lambda_{e}^{2} / r^{2}) =$$

= $f = (\hbar^{2} a^{2} / E_{\alpha e} * m_{e} c^{2}) (m_{e1} m_{e2} / r^{2})$ (547)

Then, when $r = \lambda_e$, $F_g = G$.

Gravitation is not an induced effect of the fluctuations in the electromagnetic energy of a system of molecules, but a fundamental interaction that deploys both Planckian (massbound charged particles) and non-Planckian (gravitons and massfree Aether elements) quanta, through the secondary superimposition of gravitational and photoinertial frames, and thus in a specific relationship with a third frame, that of the latent massfree Aether.

This effectively spells out the limitations of any 'geometrodynamic' attempt to comprehend the complex Phase relation between graviton energy and associated mass-energy. There is, of course, much more to the critique of ZPE theories than merely exposing their miscomprehension of gravity. Most importantly, there is another fundamental criticism which is addressed directly to the conceptualization of the ZPF: it misunderstands the nature of three distinct realities by lumping them together irretrievably - the microwave CBR, the cosmological kinetic energy spectrum of light leptons that produces the mCBR, and the ambipolar massfree energy that accelerates the cosmological leptons ^[26]. Most of the gratuitous mathematical formalisms stem from this reductionistic approach that confuses the ambipolar 'field' responsible for actually accelerating the charged particles with the ZPE field, the electromagnetic byproduct of that motion, that is, the field composed of microwave photons detected as the mCBR, and then formalizes the former - in its quality of kinetic energy of the cosmological leptons - as if it were derived from the latter, from the mCBR! The aetherometric perspective on the self-regenerating cosmological energy cycle is therefore very, very different from that proposed by ZPE theories. The actual electromagnetic or photoinertial frame defined by the mCBR is the only physical sense which the notion of a cosmological *electromagnetic* field can acquire; but this is neither a zero-point field in the sense that it exists near zero degrees Kelvin but precludes this zero-state of temperature, nor in the sense that it is responsible for the acceleration of cosmological electrons. Moreover, the ultimate source of this electromagnetic mCBR is not the kinetic energy of the cosmological leptons, but the ambipolar massfree radiation ^[11] which is directly contributed by the secondary superimposition of the nonelectric massfree Aether, in the process of creation of those cosmological leptons. ZPE theories condemn themselves to misunderstanding the entire dynamics of the mCBR generation (ie they fail to understand their very own object of study, the ZPF), by reducing the cosmological ambipolar radiation of the Space and Time continuum - and the resulting kinetic energy of cosmological leptons - to the resultant electromagnetic field.

Lastly, one might object that ZPF theories ended up by misunderstanding the relation between 'the relativistic continuum of Spacetime" and the gravitational properties associated with charged mass-bearing particles - since the former (the continuum) is standing in for the massfree Aether lattice, with its properties of secondary superimposition and antigravity or 'latent heat'. It follows that Puthoff's 'heretical' contention that General Relativity permits "faster-than-light travel" ^[113] solely prolongs the delusion that necessarily accompanies the Lorentzian transformations ^[2]. Not only does Einstein's General Relativity permit nothing of the sort, but ZPF/ZPE theories also have nothing of substance to offer in that respect. They have managed to misunderstand the real Aether, its massfree nature, the actual gravitons and even how those ZPE photons are generated by cosmological processes that are *not* electromagnetic. "The author has explained the Michelson-Morley experiment on the basis that an astronomical body might have its own aether, or space-time, rotating with it and having a boundary some distance above its surface. This idea might sound old-fashioned, but it is different from the idea of aether drag. Aether drag implies a slip or turbulence of the aether medium at the surface of a body. It is reminiscent of the attempts of Miller in performing the M-M experiment at high altitude on Mount Wilson. Miller did not obtain the null result found normally. However, the results, though definite, did not indicate the full slip to be expected (...). The author's theory does not require anything other than the null result of the M-M experiment (...)"

H. Aspden, "Physics without Einstein", p. 191

5. Aspden's theory of the dynamic Aether: inertia and gravitation

By 1959, H. Aspden had developed his unified theory of Physics far enough to publish "The theory of gravitation", where a fresh new approach was taken to the problems of frames of reference and the energy exchanges between Aether, Matter and the gravitational field. Aspden's theory admits to negative energy *states* and the cosmological role of creation of particle pairs, but it rejects both the concepts of *negative energy* and anti-Matter. After working through the fundamental dimensions of the lattice structure of a dynamic aether engaged in permanent motion, Aspden concludes to the existence of a synchronism between the angular motion of the local Aether and the angular motion of Matter: "such [synchronized angular] motion disturbs the Aether and gives rise to the phenomenon of gravitation. There is an out-of-balance centrifugal force owing to the motion of matter in the form of the atom moving in synchronism with the aether particle lattice" [119]. This clearly establishes the principle of two distinct frames of reference - one, the lattice of aether particles from whose motion ultimately arises the motion of Matter one calls gravitational motion, and the other the inertial frame of Matter itself.

However, the Aspden concept of the Aether is a complex one, composed essentially of three components - the lattice of aether particles being solely one of them. Aspden proposes two other constituents - one of which, what he calls the pervading component, being responsible for a fluid continuum capable of turbulence, and for all the electrodynamic effects of the Aether. Originally Aspden suggested that the relative speed between the continuum and the lattice was c ^[120], later he changed this to 0.5 c. He also later defined the continuum as "mainly seated in [virtual] mu-mesons" ^[121]. The presence of the lattice particle structure can be inferred from both the fact that "there is no aether drag" ^[120], as shown by the Michelson-Morley experiment, and the fact that the electromagnetic frame of reference is the reference frame for all the inertial motion of matter ^[122]. In Aspden's view, the lattice has enough rigidity and inertial mass that it can engage the motion of local Matter. Finally, the third constituent relates to a nonelectric but massive frame (of gravitons and supergravitons),

which is the very source of the hadronic conception of the Aether proposed by Aspden, and relative to which the lattice quons move with speed c ^[123]. Since this third frame moves in synchronism with the lattice, there is no electrodynamic action that it gives rise to.

Aspden's theory of the Aether is not a classical one, not a theory of a stationary Aether - or one that requires anything other than a null result for the Michelson-Morley experiment ^[124]. Instead, his theory is one of a dynamic Aether, where the interaction between the mu-meson continuum and the quon lattice is determinant of all motion and electrodynamic effects: "The Aether we envisaged is a uniform charge continuum which is positive, permeated by a system of identical electric charged particles, all negative. The positive charge is dispersed like a gas or fluid and, using the inverse square law, the mutual effects between this positive charge and the negative particles develops a restoring force on each such negative particle proportional to its displacement from a neutral position of stability in the continuum (...) The cycle time of the particle orbit is constant, independent of disturbance, because the system is effectively a linear oscillator. (...) We have a dynamic Aether, but a stable one." ^[125].

Aspden's tripartite model of the Aether effectively has nearly all of the properties required to explain storage of energy in the Aether - by specific disturbance of patches of the local lattice. In particular, he suggests that all magnetic effects of electric interactions can be shown formally to require aether reaction because "the Aether is unable to withstand turning actions. The Aether has some kind of rigidity by which it can take up linear forces but it can not resist turning forces" ^[126].

Central to Aspden's theory is his disagreement with the ZPE theoreticians, since "the property of inertia is not dependent upon interaction with the vacuum field and the energy in space as suggested by Haisch, Rueda and Puthoff. That space energy background is, however, likely to play its role in determining the frame of reference for the energy of motion (speed) of a particle" ^[127]. If one wants to employ the term ZPE, then it refers simply to the aether lattice frame that determines all electrodynamic interactions and serves, therefore, as the so-called 'electromagnetic reference frame'. But inertia must be understood "in the simplest possible way", says Aspden, as something intrinsic to the mass-bearing particles - and not to the electromagnetic frame which, by definition and observation, is extrinsic to the structure of inertial particles, even if in some relationship of contiguity. Inertia, as the property that relates mass and motion, is what connects them such that it is mass - minimum mass or rest mass - which is conserved, or, even better, as Aspden puts it, so that what is conserved is the intrinsic energy of the particle that bears mass. He asks: "what does the [mass-bearing particle] have to do to conserve its intrinsic energy, as opposed to [the kinetic] energy it has because it is moving relative to some external frame of reference [ie the electromagnetic frame]?" [127]. And the answer he gives is simple, elegant and to the point: "it must not shed [the intrinsic energy of its mass] by radiating disturbances through the 'empty space' surrounding it. (...) Mass becomes a derived inertial property as does the formula $E = mc^2$, and both stem from the simple fact that Nature allows

each and every particle in the universe to act conservatively in preserving its existence by denying radiation of [electromagnetic] energy" ^[127].

Aspden argues that particles only radiate electromagnetic energy when they undergo deceleration - and not acceleration, as is commonly regarded to be the case by ZPE theorists. If inertia presents us with a physical function, it is one that stems directly from the conservation of mass and energy - from the resistance which the accelerated particle opposes to the "accelerating force, as known from the local action of the accelerating field". We believe that Aspden broke new ground with this simple relation between inertia and the conservation of mass, even if his explanation for the observed 'relativistic increase in mass' in the Kauffman-Bertozzi-type experiments differs in essential respects from our aetherometric model: "the so called 'relativistic mass' increase with speed then becomes an attribute of inertia possessed not by the core particle or by the ZPE background, but by its satellite companions [ie the created particle pairs] in their individual form" ^[127].

All these very pertinent and systematic considerations - greatly abridged in the preceding - lead Aspden to explicitly propose the equation of electric field energy to the mass energy of a particle ^[128]:

Electric field energy = mass of the particle field times
$$c^2$$
 (610)

Aspden envisages the possibility of tapping the Zwitterbewegung, but only by magnetic couplings, not inertial ones. In fact, the gravitational frame of the Aether - as populated by various gravitons - is a counterbalancing feature to the Zitterbewegung. So, when Aspden envisages the development of anomalous lift forces, he is referring not to a ZPE interaction, but to the alteration of the gravitational interaction developed by Matter in reaction to Aether Spin. Aspden explains: "in a normal body at rest or one in a steady state of motion, the action of gravitation proceeds by the creation of gravitons of energy Mc² adjacent a mass M. These gravitons fall under their mutual gravitational action but are short-lived. Upon decay, after falling a very minute distance possibly commensurate with the Compton wavelength $[\lambda_{ce}]$ of the electron, which is less than the atomic spacing in solid matter, their energy and momentum are absorbed back into the vacuum energy system and so forces are exerted on the Space-Time lattice. (...) All the gravitational force is absorbed by the lattice physically locked on to the material of the body. The merit of this scenario, however, is that the gravitons are discrete quanta by which one can build a quantitative theory of gravitation and calculate G in terms of fundamental particle data. (...) The gravitons are created from energy borrowed from the vacuum state, as vacuum energy fluctuations which leave a virtual muon field in deficit. All this means is that we do not 'see' the gravitons as mass and only sense them by their gravitational action and by their indirect influence on the observed mass spectrum of fundamental particles normally produced under high-energy conditions" [122].

Aspden had this 'picture' in mind when he considered the "full levitation" achieved by the gyroscopic flywheel machine of Sandy Kidd. He reminds the readers that there are two distinct phenomena implicated in the spinning flywheel - one relating to the inertial effects (the force that resists turning the spin axis) and the other to its exhibiting or presenting weight; and he adds: "The right way to explain the force of gravity on that flywheel is as a force on 'something' that is separate from but 'anchored ' to the mass elements of that wheel. (...) There are, in effect, two systems spinning about that spin axis, the wheel proper and that 'something'. The apparent weight of the flywheel is really the gravity force conveyed through that link with the anchor" ^[129].

Independently of how Aspden arrives at the energy of gravitons, he clearly makes a case for the existence of two distinct frames, one gravitational and the other inertial, with the latter being the reference for the mass energy of the material elements of a body - and their motion - and the other being anchored to those same elements - or 'in superimposition with the inertial frame', as we would say from an aetherometric perspective. From Aspden's viewpoint, the two Aether frames - the lattice and the graviton frames - are anchored together in their synchronous countermotion to the fluid continuum, and this permits him to ask what happens when that anchorage 'slips' and the weight property of the flywheel is temporarily 'disconnected' from the inertial property. Aspden analyzes the anomalous findings of A. Jones, S. Kidd, S. Strachan and E. Laithwaite with force-precessed gyroscopic devices as "explicable in terms of the breach of Newton's law of action and reaction, as applied to linear momentum properties" ^[130]. He finds no out-of-balance couple with respect to the angular momentum conservation, but an out-of-balance linear force that permits "an exchange of energy from the spin state to set up linear motion" ^[130]. This fits precisely, and alone, with Aspden's Law of Electrodynamics - and not with Lorentz's, Maxwell's or Ampére's Laws. Aspden comments on this direct relation between his Law of Electrodynamics, of form given by:

$$F = (qq'/r^3) [(v'.r)v - (m'/m)(v.r)v' - (v.v')r]$$
(611)

and the Gravitational Law: "(...) my law (...) works for gravity, because the imbalance of linear force vanishes in the special case of mutually parallel charge motion and the law then fits the form of the gravity force" ^[130]. This can be seen from his Law when "the gravitational effect is set up by fundamental charges of the same polarity, same mass and same velocity (v=v')": "then the first two terms", (v'.r)v - (m'/m)(v.r)v', "cancel to leave a mutual force of attraction acting directly between the charges and fully satisfying the action-reaction law of Newton". Aspden claims therefore that the link between gravitation and electricity lies at the heart of the needed understanding of electrodynamics. He retraces the history of the Schuster-Wilson hypothesis that mass M exhibits a 'magnetic field', as if it had charge equal to:

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He suggests that this 'magnetic field' effect of charge is the gravitational property of mass M ^[131]. This leads him to extract the fundamental form of the electrodynamic interaction subjacent to the constant G, effectively as a superimposition of charges in a differential relation towards a superimposition of masses, or what Aspden denotes as the function of the squared charge-mass ratio:

$$G = Q^2/M^2$$
 (613)

This is indeed a dimensionally-correct expression that leads - on the basis of systematic considerations of the size and dimensions of a quon lattice unit, and the Aspden model of the finite, volumetric electron - to an electrodynamic-based expression for G ^[132]:

$$G = (e/m_e)^2 \alpha^6 \left[4\pi/(5063)^4\right]^2 (r/d)^6 (4/3)^6$$
(614)

where d is the unit linear distance between two lattice elements and r the radius of the displacement between the quon particle and the fluid continuum, with the remaining geometrical factors being derived from the aether lattice structure, the graviton energy (5063 m_e c²) and the finite volumetric model Aspden proposes for the electron. In his own words, the ultimate evaluation of G should be performed "in terms of an effective graviton mass M, which ought to be that of a lepton" ^[133]. Aspden would later provide other parallel expressions for G based upon the Landé g-factor for the electron and the Thomson electron radius a, which retained the e^2/m^2 term ^[134].

The reader can readily contrast Aspden's function for G with the aetherometric functions we have presented in the present monograph. Elsewhere ^[35,115], we have contrasted in detail Aspden's model and the aetherometric model of the Aether lattice and the G functions. When contrasted to all the other functions for G - whether from General Relativity, quantum relativity, particle physics, geometrodynamics, supersymmetry or ZPE theories - Aspden's function for G has only merits: the function is dimensionally correct; it requires charge and mass superimposition; it invokes a testable microphysical structure; it connects to a well-defined model of the Aether, and it invokes no relativistic transformations. In fact, at the terminus of our overview of theoretical contributions to a science of gravity, Aspden's work stands as a unique event. He alone appears to have been on the right track of the connection between gravity, electrodynamics and the Aether.

In the next monograph we shall examine the aetherometric model of energy, Matter and Aether in light of the electric and nonelectric structure of the Aether lattice. We will explore further the physics of inertial resistance to acceleration, present the aetherometric theory of antigravitational action and discuss our novel experimental evidence for electro-antigravity. Finally, we will re-examine the physics of pair-destruction engines and explore fundamental ways to directly engineer the Aether lattice.

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4. Idem ("The general theory of Relativity"), p. 58.

5. Idem, p. 60.

- 6. Einstein, A (1950) "On the generalized theory of gravitation", Sc Am, April, p. 182.
- 7. Einstein (1956), op. cit., ("The theory of Special Relativity"), pp. 31-33.

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9. Einstein (1956), op. cit., ("The general theory of Relativity"), p. 64.

10. Einstein (1956), op. cit., ("Relativistic theory of the non-symmetric field"), p. 141.

11. Correa, P & Correa, A (2006) "The Gravitational Aether, Part II: Gravitational Aetherometry (8), Antigravity lift and exotic flight (III): the aetherometric theory of gravity and the organized fear to know", Volume II of the Aetherometric Theory of Synchronicity (AToS), Chapter 8, Akronos Publishing, Concord, Canada, ABRI monograph AS3-II.10.

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13. See Will, CM (1986) "Was Einstein right?", Basic Books, NY, NY, p. 166. This clearly illustrates how the original concept of antimatter fundamentally repelled Einsteinian physics.

14. Kaufmann, WJ "Relativity and Cosmology", p.140. The "officiating" alternative to the Big Bang theory is the whimpering 'steady-state theory', largely based in the work of F. Hoyle, H. Bondi and T. Gold, where it is accepted that the universe is expanding, but a continuous creation of

matter fills the increasing void interstices; see Kaufmann, pp.141-146.

15. Einstein (1956), op. cit., ("The general theory of Relativity"), p. 83. This is, in effect, a sound aetherometric principle, one where conservation can only correctly apply to all variations of 'Aether plus Matter'.

16. Bergmann, P (1968) "The riddle of Gravitation", Dover Publications Inc, NY, NY, 1992 ed., p. 65.

17. Einstein (1956), op. cit., ("The general theory of Relativity"), p. 99.

18. Idem, p. 108. Note how Einstein does not hide his mechanistic-materialist inclination.

19. See the criticism we have addressed to the direction Einstein took in his approach to the problem of a gravitational Aether, in Correa, P & Correa, A (2006) "A running commentary on Einstein's "Aether and the Theory of Relativity", Akronos Publishing, at:

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20. Ibidem. Please note that the propagation of potential is the very basis for the propagation of the stimulus of light, not to be confused with light or electromagnetic energy, nor just an action of massbound charge upon massbound charge, as C. Neumann supposed. In fact, as one concludes from Aetherometry, the propagation of potential *is* the propagation of *an electric field*, and the field is one that *acts electrically* upon massbound charges to confer upon them kinetic energy, ie set them into motion with a given *electrically-polarized direction*. Now, the propagation of potential does not abide by the speed of light; instead, it obeys its own longitudinal electric wave *and energy* functions. It is only electromagnetic that field which the massbound charges generate as light (local photons), or pass on - by photon reabsorption and thus transmission of a kinetic state - to other massbound charges. But this electromagnetic field is just a secondary field, not the field associated with the transmission of electric potential that primarily accelerates those massbound charges, and which those charges can transmit *without* photon generation.

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