

Gravity and c^2 -inertia

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Abstract

In 1905, Einstein was not able to explain his postulate $c = \text{const}$ differently than only by symmetry. If a person moves an electrical conductor in the presence of a magnet, current will appear in the conductor. If the person moves the magnet now in the presence of the conductor, the current will again appear in the conductor - regardless of the fact that he homocentrically explains that it is once because of the electromotive force, another time because of the magnetomotive force, depending on what he holds in his hand. Yes, the unique electromagnetic force is transmitted at the same speed whether the magnet or conductor coordinate system is stationary. Equal and symmetrical. And precisely because of that equality, that is, mutual relativity, that Einstein's explanation with the train and lightning on the railway embankment is not valid. Because of tacit homocentrism also the twin paradox is only a pseudo paradox, because of a misunderstanding of the postulate $c = \text{const}$.

The real explanation for $c = \text{const}$ is c^2 -inertia, c^2 as a measure of inertia, not mass. So can such an explanation open the way to understanding that deep connection $\epsilon_0 \mu_0 \mathbf{m}$ between electromagnetism and gravity, and finally perhaps make the graviton hypothesis redundant precisely because the inertial and gravitational masses are not only equal but identical – that is, if they really are?

I specifically summarize my five previous articles on viXra.org here with the intention of showing that the title of this article is appropriate: it suggests that Einstein's theory of relativity should be understood via c^2 -inertia and not via assuming masses already realized, whereby the light speed $c = \text{const}$ appears to us *post factum* only as kinematic quality.

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Introduction

In a world where everything is changing, emerging and disappearing, one can still understand that body mass in motion is relative. But that the velocity of light c is the same in all inertial coordinate systems no matter what velocity v they move with each other, this is not easy to understand. And the fact that “no one understands why nature behaves this way” (Richard Feynman), although we have mathematics by which experiments in quantum (hence relativistic) electrodynamics can be predicted even most accurately of all experiments, this is—I would say—because no one understands $c = \text{const}$. This absolute $c = c \pm v$ cannot be understood at the **macro** level, because at the **micro** level it is actually relative—in an infinite vacuum, being in itself only a **virtuality**. And something that is merely a virtuality, whether it has always been, forever and eternally, as a bare possibility in itself, is **inertia**, and cannot be the absolute but merely **relativity**. The speed of light is the characteristic of such a vacuum, of such a universe, that is to be understood.

Once a photon is emitted, it is a matter of vacuum and that immeasurable universe. Once emitted, it lost the measure of the emitter’s coordinate system, becoming virtuality itself—only a possible, therefore indefinite quantum of energy. It is only when receiving into the new coordinate system that it is realized as a definite addition Δm to the mass of that receiver, obtaining its measure of both time and length. That is why Nature behaves this way: because it is blindly indifferent, or, if someone wants, righteous as God: with precisely specified atomic levels and Planck’s constant h , each one gets righteously Δm by the integral and omnipotent c^2 -inertia. And if someone wants to know where the photon came from and what time it is there, here’s Lorentz transformation; if one wants to calculate how much this or that is right here at him, where his mass is M , here’s Feynman functional integral, so let’s him calculate not only straight-linearly but also by all possible paths in the space of this from-to-distance Δl . Indifferent Nature, as if **on the basis of c^2 -inertia** at all times “knows” how much is the from-to-integral, it does not concern whether we call which energy quantum a photon or graviton. **Nature simply tends to keep this distance Δl constant**, so the two gravitational masses rotate around each other in a completely equal manner, i.e. symmetrical—in a circle when there is no Doppler effect. Here, the Doppler effect is only a consequence of the fact that Nature, of course, by inertia, also takes into account the initial conditions: it keeps (accor-

ding to its universal way of space-time) the from-to- Δl constant in spite of the fact that it nevertheless changes with (our earthly) time, is it a circle or this or that ellipse, etc. Then why to distinguish whether this primordial energy, merely a virtual and indeterminate quantum of energy, is afterwards realized as a photon or an undiscovered graviton? Why, if $c = \text{const}$ is in fact an integral consequence of c^2 -inertia, when that is the measure of inertia, not mass?

Does this understanding of the postulate $c = \text{const}$, as c^2 -inertia, open up which new avenues for scientific research?

How come this world of mass exists at all?

The first article of five published so far¹ on vixra.org, **THE BIG BANG AND ITS INTERNAL LOGIC: The Universe As Relative Zero** is just about that: how come this world of mass exists at all? It exists by being always and forever just like **inertia**, without any beginning and any Dot as a thoughtful beginning. Simply an objective vacuum and its All-infinity, with any at least **virtual** Dot, this one, that one, anywhere, anytime—countless dots as possible zero-coordinate beginnings, every relative ones. In that way, vacuum by itself has got no measure and it is completely indeterminate—down to a certain c^2 -realization by the inertia of the entire universe. However, relative virtuality close to virtuality, that **relativity** itself is creative. Even more dense and denser, it will be disclosed in the real point. Even more powerful and powerful one, it explodes through the Point into realization as—**symmetry**. In this article, otherwise written according to the 2014 book of the same name, in this book, temperature has been defined for the first time as a micro-expression of relativity in vacuum. Otherwise, the thesis that *all the infinite multitude of the so called elementary particles with or without mass, charged or uncharged, energy relevant or virtual etc is, however, only mode in which vacuum can exist*—that thesis has been already stated in book **ESSEY ON GOD**, published back in 1976. Also the thesis that not all photons from the same source and of the same frequency are the same: each will reach its mobile or fixed receiver at its own velocity $c = \text{const}$. In socialist Yugoslavia, the book remained without access to bookstores, completely tacit. This internal logic of objective nature, just because is called logic—in which can be trusted as in God precisely because it is believed in Matter—was understood as a religion, something contrary to dialectical materialism. After all, and now with the internet and free access to scientific articles in the world, it was worth returning to this topic. Photon-coordinate systems are also offered an explanation for the EPR paradox.

The light speed as c^2 -constant only by admission into atom

The second article **IN COSMOLOGY, C^2 IS THE MEASURE OF INERTIA, NOT MASS** accurately explains the thesis that Einstein's $c = \text{const}$ cannot be understood on a macro level, that Einstein's example with train and lightning is inadequate, and that $c = \text{const}$ can be explained only at a micro level, using Heisenberg's uncertainty principle. As a measure of the inertia of the entire universe, hence of the vacuum too, $c^2 = \text{const}$ is actually a synthesis of macroscopic analytical causality, on the one hand, and microscopic indeterminacy and chance, on the other. Heisenberg defined uncertainty at the atomic level. This time it's about the uncertainty of the vacuum itself, the speed of light itself, about the path of a **virtual** photon until, with Planck's constant h , it is realized into a new quality—**reality**: addition to the mass Δm of some atom-receiver. The speed of light as a constant, that is the explanation, is only created by realization in an already existing atom-mass. That's why the twin paradox doesn't make sense, i.e. on the macro level of already created mass it has a trivial solution: time will flow fastest in that coordinate system which man takes to be immobile; with the realization of mass, time does begin at all, it does not flow for photon itself.

The speed of light as c^2 -constant. So, only with the realization into an atom. However, since $mc^2 = hv$, why only the speed of light? Why would only the c^2 -constant be realized in this qualitative leap from virtual vacuum indeterminacy into the determination of atom-mass? Why not also Planck's?

The gravitational constant in the same context as Δm -realization?

The following is the third article, **UNIVERSE, INERTIA AND UNIVERSAL CONSTANTS**. The reception of photons into atom-mass realizes not only the light speed as the constant but obviously also the Planck's constant—if not Boltzmann's too, for example, which, as statistical one, is probably to a certain extent only a consequence of fundamental constants, that certainly include also gravitational one, which should be viewed in the same context of virtual photon along with its Δm -realization. All fundamental constants are the result of this qualitative leap from the virtuality of vacuum into the realization of the objective world of mass. To understand this, Einstein's relativity must be extended to photon-coordinate systems, and see how Lorenz transformations behave with respect to them—passing through the singularity $(0, \infty)$. The mathematics of the general relativity theory itself points to this idea by the postulate that for photons the differential of the interval between two events in the world of already realized

mass (x,y,z,t) is always zero, $ds=0$, especially because the symmetry of the objective world of mass originates from the symmetric relativity of vacuum—again by passing through singularity. An example is the singularity $(0,\infty)$ of Planck’s law by which the black-body radiation (as if) passes (why not?) into Maxwell-Boltzmann’s probability distribution. So further consistent application of symmetry would necessarily require, say, Maxwell-Newton’s postulate for the vacuum diamass-displacement, analogously to Maxwell’s for the dielectric displacement. Adding to this that due to inertia there couldn’t have been only one so-called “big bang”, then we come to the explanation of dark energy: with each new “big bang”, the vacuum diamass-displacements add up—the total velocity of change of space-time metric is greater than the light velocity at each newly created mass, yes, again symmetrically: by vacuum implosion-explosion. Maybe in the so-called black holes?

If all the mass of the world M were constant...

The fourth article, **THERE IS NO COORDINATE SYSTEM WITHOUT MASS** concludes first that man cannot get rid of his own **technical** coordinate system, one that is bound to mass by his conscious or unconscious choice. He cannot by the very fact, that man himself and the whole environment he is handling, all this are already realized masses. These are the coordinate systems of already realized atoms, already realized atom-frequencies ν as a measure of their own time and their own length c/ν . For example, strontium atomic clocks. But if man wants to solve *how come mass exists at all*, then he must start from the vacuum itself without any mass, although vacuum is a completely indefinite infinity: only **inertia** of only possible energy quanta, which, each quant for itself, moves in any way, i.e it is pointless to wonder whether which quant is at rest or at what speed isn’t at rest. This possibility, this **virtuality** is eternal, but time Δt is not, it is always relative to the ever-again relative mass Δm . This best illustrates the way in which quantum electrodynamics calculates the functional integral of the least action: the path of a photon is whatever, but the moment of realization is the same; any path of any length, but the realization of $c = \text{const}$. Of course, with the interference: not always the same probability that an indicator will be affected at this or that point. And yet—as if light had traveled different lengths at the same speed at the same time. How is that possible? Only by being $c^2 = \text{const}$ with probability that the mass Δm will be realized if there is already a possibility ΔE for realization, by being that probability is always the same one at the integral level, $1/c^2$. By the **inertia** of the entire Universe...

What should apply to the whole Universe, therefore $M/E = 1/c^2...$

That is, if the mass of the world M were a constant, created once and for all.

There are relevant scientific articles proving that mathematics of general relativity theory and wave quantum mechanics predicts, under certain conditions, the gravitational collapse at a singular point of mass M of infinite density—whereby the collapsing mass emits particles of such and such spectrum into the surrounding space. On the other hand, there are articles showing that the total emitted energy of gravitational collapse is $-M$ in relation to the singularity at the center, i.e. that all gravity energy we know is equivalent to mass $+M$ if the singular mass is behind the horizon of the black-hole event $-M...$

That is, if all the mass of the world M were constant...

Or when it would not be clear anyway that the general relativity theory needs to be reconsidered—although or precisely because the gravitational waves were finally proven in the recent spiral collision of two giant black holes; to be reconsidered “*from the bottom down*” (Robert Laughlin), starting from the very postulate $c = \text{const}$ —although the special relativity theory is perfectly proven and the relativistic quantum electrodynamics is in the greatest agreement with the experimental measurements.

Non-convergent binomial series and dark energy

In the fifth, last article, **EINSTEIN’S $E = mc^2$ AND DARK ENERGY**, once again, efforts are being made to think about it *from the bottom down*, but not in the way Einstein could have thought at his time: all the world, this is our Galaxy with mutual velocities no greater than the promise of light speed, so the mass of the whole world is one, regardless of the fact that radiation is transmitted from one body to another; within the bounds of this promise it does not matter that the binomial series is not convergent; and since the world is bounded by the space-time sphere, this light energy is nowhere but in the sphere with the equivalent of mass M .

It is reported that Einstein was not religious. And yet this ingenuous creator of relativity theory insisted on absolute causality, strangely enough, just because of science, he has not allowed for chance—the whole world into the space-time sphere just because of science. Infinity all in the circle, all in the One. A man in search of that last explanation, one and only— as God? Well, from that homocentric perspective, relativity cannot be perceived as a solution to the twin paradox. Nor an inconsistency in the example of the train and lightning.

Today is an opportunity to make difference. One and only, but with difference. Not only that all coordinate systems related to mass, whether mobile or not, moving along geodesic lines of space-time by **inertia** are equal in describing natural laws—but coordinate systems related to massless energy quanta contribute equally to that description. Unity of **symmetry** in the difference between mass and vacuum. That mass and also this one, why only one M and one “big bang”, after all why just big, why not simply through the singularity, be it just the singularity with which a massless photon is added to an atom-mass as Δm ?

Starting from this idea, the cosmological constant λ could be perhaps calculated as a consequence of this unity in symmetry, rather than as a mere arbitrarily postulated addition? And at the micro level the consequence of this symmetry would be infinitely many so-called elemental particles as the very way of vacuum existence?

This article specifically shows that Einstein in 1905 and 1906 proved mathematically only the relation $\Delta E = \Delta m/c^2$, which can be replaced by the macroscopic equation $E = mc^2$ within the boundaries of our Galaxy. On a universal scale, this equation becomes $dE = c^2 dm$ and would have to be integrated, which opens the possibility of an infinite, let’s say, integration constant since the appropriate binomial series does not converge. With special nonlinearities certainly. A space of dark energy...

Conclusion—only by metrically indefinite affine geometry

In the attempt to finally understand the postulate $c = \text{const}$, this article shows how the idea of an immutable photon $h\nu$, that, once emitted, moves through vacuum by inertia, how this idea had evolved to symmetric inertia of the vacuum itself with relative zero—objectively, look, with any mass as the beginning (as measures of time and length), subjectively, here, with the man’s thought and his coordinate beginning (whether he knew it or not, it was just a technical coordinate system).

The significance of these considerations lies in the question: can the relativistic gravitational field equations be corrected according to the explanation of this postulate so that the cosmological “constant” λ is the consequence of considering light velocity as c^2 -inertia—although, of course, it would turn out that it is not really a constant but a function of distance?

As a purely kinematic phenomenon, the constant light velocity can have only one explanation: that already at emission, the **photon** “knows” into which atom-mass will be trapped, and “retains” the **initial distance** in the coordinate

system of the receiver by adjusting its $c = \text{const}$ according to it. Of course, this would be “a spooky action at a distance” (Einstein’s term), at whatever constant speed: Lorenz’s transformations (mathematically) are valid whatever velocity v_0 a person takes that it is the same in all inertial systems. That’s why the real explanation is only at the dynamic level: this constant c is created as an integral consequence of c^2 -inertia only when photons are realized. The symmetrical inertia of the vacuum itself is a force that remembers and maintains that **initial distance**. Which is why the two masses rotate around each other and, therefore, to postulate **graviton** seems superfluous?² But then how in a complete darkness — is there any at all when there are electromagnetic waves with 2.7^0K too? Does this mean there is no gravity at absolute zero? How, when nothing absolute can be, again some singularity?

The significance of these considerations is that, with the $c = \text{const}$ explanation given, it is fairly certain that a correction of the general relativity theory must be sought with a metrically indefinite affine geometry,² no matter how well any mass defines the curvilinear metric of already realized space-time — must be sought by the synthesis of these two geometries.

These considerations could serve to that.

References

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