Einstein, Heisenberg and c²-inertia

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Abstract

The conflict between Einstein and the Copenhagen school of thought is well known in the history of science. On the one hand, Einstein's strict determinism, on the other, Heisenberg's uncertainty relations, the collapse of the wave function and the chance at the micro level, regardless of the macroscopic explanations of the postulate $c_{max} = \text{const}$, regardless of the initial mass. At the time when our Galaxy was the whole world and the mutual velocities in it were negligible according to the speed of light, Einstein held that the mass of the world was one and unique. In 1985, in a lecture on quantum electrodynamics—**QED: The Strange Theory of Light and Matter**—Feynman says that he only describes how nature behaves without being able to explain why it behaves like that because no one understands this; and Laughlin in 2005 says, already with the title of his book—**A DIFFERENT UNIVERSE: Reinventing Physics From The Bottom Down**—that an effort on understanding this fact to humanity is yet to come.

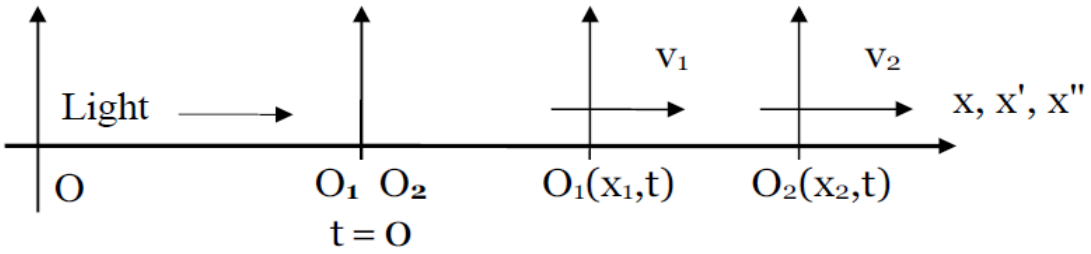
This article shows that one should start from the very postulate $c_{max} = \text{const}$, rethinking this experimental fact—because Einstein's explanation from 1916 is insufficient and in fact wrong: he tacitly takes the coordinate system of the railway embankment as absolute, and to the train speed adds to or subtracts the light speed. And rethinking will lead us to the necessary Heisenberg relations of uncertainty, c²-inertia and new insights into the property of relativity and symmetry of the vacuum itself, to the explanation of the EPR paradox and the so-called the twin paradox. And all together to one Universe, really different from how we imagine it today with a big bang.

Contents

At the macro level, an explanation of the postulate c=const is not possible

It is no wonder that this postulate is not explained in serious scientific articles, and that Einstein's example with the train and lightning from 1916 is only mentioned somewhere in popular lectures when the audience's attention should be tickled.

At the macro-level it is indeed not understandable. Let us have a look at three inertial coordinate systems, the fix, immobile Ox-system, and mobile O_1x' and O_2x'', it is sufficient to mark only the coordinate beginnings and x-axes:



If the current light wave has been emitted from the immobile system in the positive direction of the x-axis, let us suppose that at that moment the other two systems are parallel and coincide, although they move at different speeds v_1 and v_2, their coordinate origins O_1 and O_2 are in the same place. After a while, measured from the system that emitted the light wave, the O_1 system will be at a distance of x_1, and the O_2 system, let us suppose, at a larger distance x_2. And both systems received the emitted light at the same time, because all the experiments show that Galileo's speed addition is not valid for light, but that c plus whichever v is again only c. So, the light traveled at the same speed yet it passed different distances over the same time, and all of that was measured in the system which emitted the light: up to x_1 and up to x_2. **The elementary contradiction!**

This contradiction can be resolved only at the micro-level, taking into account the fact **a) that photon emission and propagation through vacuum is one event, and photon propagation and reception is another.**

In the four-dimensional space-time of relativity theory, the position of any particle of mass m_1, m_2, m_3, etc. at any given moment is described by quoting all four of its coordinates in relation to, for example, the resting mass m_0, $S_0(t, 0,0,0)$.

S_o $S_1(t', x', y', z')$ is one event and $S_2(t'', x'', y'', z'')$ is another, and so forth, while the intervals $S_o–S_1$, $S_o–S_2$ or in general, the intervals between any two events $S_1–S_2$ in differential form are the same, also for the case of curvilinear coordinates:

$$ds = cdt\sqrt{1-\frac{v^2}{c^2}}\,. \qquad (1)$$

And that differential is always positive because of c_{max}, except for photons. For a particle without mass, for a photon in its own coordinate system it is zero. As long as the photon is in vacuum, it is all the same event, its time does not flow, $t_f = o$, so wherever it is, (x_f, y_f, z_f). It is as if it were a virtual, simply naked possibility until it is caught in some new atomic mass where it will be realized–embodied by now adding mass Δm to it.

This can be seen even better by the Lorentz transformations: for a photon in relation to rest mass, the dilatation of time is infinite, so its time does not flow at all, it is always zero; by this uncertainty o/o it adapts to the time measure of any receiver mass. And due to the infinite contraction of length, it also adapts, by the uncertainty $\infty\cdot o$, to the unit of length of that coordinate system, each photon to its receiver.

Hence **b) not all photons of the same frequency ν from the same emitter are the same—each will be such that it reaches its receiver at the speed c = const.** Mathematically:

$$c^2 = \frac{h\nu'}{\Delta m'} = \frac{h\nu''}{\Delta m''} = \frac{h\nu'''}{\Delta m'''} = itd... = \text{const}\,. \qquad (2)$$

At the moment of emission, a photon lost the measure of emitter's coordinate system, its frequency ν is indeterminate because it is uncertain, completely random, in which atom-receiver it will be caught. Its energy $h\nu$ is also indeterminate. Moreover, it has no energy per se because it does not have any frequency in its own coordinate system, its time does not flow—the photon is a virtual one. And so on like that—although in the coordinate system of the emitter, specifically in $O(o,t)$ time still flows. Only when a photon reaches its receiver, specifically, those photons being captured in the O_1 coordinate system after time t_1, only then does their time begin to flow, that is now the time t' of that coordinate system. Those photons which are not captured, their time still does not flow until at the time t_2 of the time measured in the emitter system they are captured in another coordinate system, in O_2, that is now the time t''.

In other words, only at reception is the speed of light realized as the c^2-inertia of the entire cosmos. This is not only about the Doppler Effect due to the divergence or approximation of the masses, but also about the relativistic shortening of the length just like about the energy of the vacuum itself. Hence the unity of vacuum and particles with

mass, **the very way of existence of vacuum is in unity with particles — by c²-inertia of the whole cosmos.**[1)]

This is the solution of the EPR paradox: the inertia of vacuum itself. If a spin of one entangled photon is +1, then the spin of the other is immediately -1. It is also the symmetry of vacuum. Symmetry also solves the so-called twin paradox: no matter how many inertial coordinate systems there are, S_1, S_2, S_3, S_4, S_5, etc. — time will flow fastest in the one which a person chooses to rest[2)] because only in it all speeds are calculated as absolute while speeds all others are relatively added together. This, however, is no longer a simple mutual symmetry of two coordinate systems, but the symmetry of the unity of vacuum and particles with mass has been preserved–becoming more complex, cyclical: $\mathbf{S_1}$, S_2, S_3, S_4, S_5 .....; $\mathbf{S_2}$, S_3, S_4, S_5, S_1 .....; $\mathbf{S_3}$, S_4, S_5, S_1, S_2 .....; $\mathbf{S_4}$, S_5, S_1, S_2, S_3 .....; S_5, S_1, S_2, S_3, S_4 ..... And so on.

And it can already be seen that the hypothesis of the big bang as the beginning of the whole world is not sustainable. However, no longer because of geocentrism, not because of heliocentrism, it is not sustainable because of homocentrism — because of the coordinate system which man (homo) himself choses to be fixed. Why, namely, would the perfect symmetry of nature be disturbed only because man measures c_{max} starting from the mass he chooses and only up to his horizon, even if he declares that mass no matter how large and no matter how high the density is?

However, how to understand that a constant speed of light is formed only in a collision with a mass and that as a c^2-constant?

Heisenberg uncertainty principles applied to a photon

In 1900, Planck found the formula for black body radiation, which was possible not with a continuous change in the radiation power but with a quantized, always basic quantum $h\nu$. In 1905, Einstein also interpreted the photoelectric effect with the same assumption: a black body absorbs electromagnetic energy quantized, also by photons. In 1909, Rutherford proved experimentally that the atom is not indivisible and proposed a planetary model for the nucleus and electrons, leaving the problem of spiral collapsing unsolved. And in 1913, Bohr postulated that an electron does not radiate while in an orbit whose circumference $2r\pi$ multiplied by its momentum mv is equal to the integer product of Planck's constant h, $2r\pi mv = nh$, $n = 1, 2, 3$ ... It radiates only when it jumps into an orbit of a lower energy level, just as it transitions to a higher energy level by receiving a photon. The postulate was experimentally confirmed in the same year. In 1922 Compton proved that a photon, although it has no rest mass, has a momentum of exactly the same shape as the momentum mv of a body with mass, i.e. mc, but this m is realized only in the atom as the energy difference between higher and lower levels,

$mc^2 = h\nu$, and hence $\lambda f = h/mc$. In 1924, De Broglie assumed that, like a photon, a particle with a mass must have an appropriate wavelength, i.e analogous to h/mv that explains stable orbits in an atom: an electron does not radiate because then its wave is standing. In 1925, Heisenberg published his quantum reinterpretation of kinematic and mechanical relations, describing by matrices those electron jumps in orbits, while Schrödinger used De Broglie's wavelength in the same year and set up his wave equation—a year before electron diffraction was experimentally proven. Interpreting his quantum theory now with the help of the wave nature of both light and electrons, Heisenberg published his famous uncertainty relations in 1927: the position and velocity of a micro-particle cannot be known at the same time, one of the two must remain indeterminate, from measurement to measurement by chance.

Einstein did not like this chance, he considered Heisenberg's uncertainty relations to be a consequence of, admittedly, a possible but insufficient theory—the cause is missing. There must be hidden variables that explain that otherwise ghostly action at a distance, he said on the occasion of entangled wave functions from the same source arbitrarily far in both directions. And so the postulate $c = \text{const}$ has remained unexplained to this day. That is, I do not know that anyone has dealt with it in particular, that anyone has applied Heisenberg's uncertainty relations to the macroscopic dimensions of the relativity theory. Compton, for example, proved the x-photon momentum in a collision with a free electron, but here is an electron of negligible velocity relative to the speed of light, practically both the photon and the electron are in the same coordinate system from the beginning. However, only at high speeds of mutual movement of coordinate systems (emitters and receivers in relation to the stationary system) does the significance of the indeterminacy of the photon impulse, and therefore the speed of light, manifests itself–when that indeterminacy must be taken as a fact in itself. And no longer Δp as part of the momentum mc that the photon loses in the collision with the electron losing at its frequency, not only $\Delta p = h\Delta\nu$, but

$$\Delta p = c\Delta m + m\Delta c. \qquad (3)$$

When a photon from relativistic great distances finally came to this or that, by chance, but finally to this, quite definite receiver, the uncertainty of the spatial coordinate of reception is zero, $\Delta x = 0$, no matter how the receiver itself moved relative to some third system at rest. Heisenberg's uncertainty relation dictates, however, that it must be $\Delta p \Delta x \geq h$. And this is not an uncertainty due to an imprecision of measurement, but an objective uncertainty: with countless different velocities $v < c$ up to the speed of light, it is completely uncertain in which atom the photon will be caught. Heisenberg's inequality is an objective condition,

$$(c\Delta m + m\Delta c)\Delta x \geq h \rightarrow (c\Delta m + m\Delta c) \rightarrow \infty \qquad (4)$$

Since Δm is an insufficient micro size, it remains that all possible macroscopic difference in the speeds of the coordinate systems of the emitter and a particular receiver is covered by the uncertainty Δc: thus, according to equation (2), the speed of light is adjusted to the measures of length and time of any receiving atom. The vacuum itself, in unity with all hitherto mass-realized particles, integrates all the space around the receiving atom in order to maintain its c²-inertia with the principle of least action. This immeasurably infinite and eternal vacuum shows its c²-inertia over and over again only through a precisely defined realization of the Δm-mass in the receiving atom.

Determinism and chance do not contradict each other, but are, on the contrary, in the mutual relationship of relativity and symmetry.

Immeasurably infinite and eternal universe

In 1917, at the time when Einstein announced his Cosmological considerations with the general theory of relativity, the prevailing opinion was that our Galaxy is the whole world, so where will you have larger masses than the mass M of the whole world! Whether Einstein knew of Olbers' paradox, that warned that standing stars could not be uniformly further and further in infinity in Euclidean space, because the sky would have to shine even at night, or he did not know, he was satisfied with his solution of the gravitational field equation, which due to the curvature of space-time, predicted a gravitational collapse at the coordinate origin. Therefore, he arbitrarily postulated a cosmological λ constant that played the role of negative gravity and prevented that collapse. But when Friedman showed that, depending on the initial conditions, the relativistic equation of the gravitational field has also without a cosmological constant not only a stationary solution but also a solution with a negative space-time curve, where space expands, which is confirmed by Hubble's law, Einstein renounced his constant.

In all likelihood, however, he did not have the ambition to figure out the very origin of the whole world, but rather simply to inform the Prussian Academy of Sciences out of scientific curiosity as to how the space-time geometry could look like in the context of the newly established theory. Otherwise, whoever would decipher the very origin of the World with the ambition to describe it with the coordinate system of certain units of length and time, would first have to ask himself:

Whence the coordinate system in general, whence its measures of length and time **in the otherwise immeasurably infinite and eternal Universe?**

He/she would have to state, therefore, that without mass there is no such coordinate system.[3)] Especially scientists know that neither time nor length is measured by our terrestrial foots but by atomic clocks, for example time by a certain frequency of cesium 133 and length by the wavelength of this frequency.

In an immeasurably infinite and eternal vacuum, only a captured photon defines a certain time and a certain length.

The thing is simple: one cannot assume that mass exists, and then from that assumption prove that the world of mass exists. In the history of philosophy, it is the long-known so-called ontological proof of God.

Definition: God is a perfect being.

Copula: Something cannot be perfect without existing.

Proof: So God exists.

That is why Thomas Aquinas (1225–1274) does not seek to prove God, but metaphorically interprets the Bible to formulate basic theses about Him, for example:

a) God is always and eternal,

b) In countless ways, only He makes existence by setting everything in motion.

c) God is everywhere, so in His infinity is the unity of the world always.

Theses that could still be believed today, theses to which the proponents of dialectical materialism of the 20th century swore in their own way as if facts without proof, for example:

a) Matter is uncreated and indestructible,

b) It is in eternal movement and transformation,

c) In infinite Matter is all the unity of the world.

They replaced one word with another—not noticing that their theses stand in a mutually relative and symmetrical relationship with the scholastic theses of the middle Ages. The only thing is that you don't see God and you seem to see Matter as an objective reality, which is, of course, a matter of enlightenment, but which has nothing to do with the answer to the question of how the World exists.

Both these are simply homocentrism, which as such eludes objective reality.

So:

"Why is there at all something and not rather nothing?"

EINFÜHRUNG IN DIE METAPHYSIK, the very beginning

Cosmology can help philosophy solve this riddle. Philosophy, on the other hand, can help cosmology not be homocentrically naive.

First of all, it should be noted that both the theses of medieval scholasticism and the theses of the dogmatic dia-mat speak of inertia: something that is always and eternal or, in the other hand, uncreated and indestructible–that is **inertia**. And inertia itself carries symmetry: whatever moment you choose as zero for the beginning of time, on the one

hand it is $+\infty$ time, it is the future, and on the other $-\infty$, it is the past. Emmy Noether also showed mathematically that every law of conservation, of energy, impulse, angular momentum, carries symmetry. Not only temporally but in general: whichever point we choose as zero for the coordinate origin, we will have **symmetry** both left, right and back, forth and in general in all directions, a homogeneous and isotropic space. And every symmetry is one in relation to the other—just **relativity**. No zero is absolute, the world cannot have its beginning: before that beginning nothing and then, behold, the whole World. In fact, the Universe cannot have a beginning. But what the ancient Greeks called the cosmos, that can have—however, not an absolute beginning. If our world is the part of an Universe, and it is, the Universe which is always and forever, and it is, then even the beginning of the cosmos cannot escape relativity and symmetry; specifically, **the mutual relativity and symmetry between—causality and chance.**

Hence, in 2014, I published a book entitled **UNIVERSE AS A RELATIVE ZERO** and subtitled *The Internal Logic of the Big Bang*.[4)]

Of course, it is not about one single Big Bang as the beginning of the whole World, but about one, two, three, accidentally where and when, but necessarily over and over again about Big Bang, where an implosion and then the explosion of vacuum creates the mass M_i (i = 1, 2, 3, ...) for entire groups of galaxies, for example, with the symmetrical expansion of space-time geometry around that mass over and over again according to, let's call, Maxwell-Newton postulate,

$$M - \oint dm = 0\,, \tag{5}$$

With dm diamass displacement of vacuum over and over again, analogous to Maxwell's dielectric displacement dq,

$$Q - \oint dq = 0\,. \tag{6}$$

A nice illustration of this MN postulate as well as the unique symmetry of the gravitational field and macro mass is the article by K. Shimizu: *Gravitational Energy of a Schwarzschild Black Hole*.[5)]

In doing so, each such mass would have its own c_{max}, perhaps its own different constant h and universal constants in general. In other words, the speed of light measured from the mass of its origin would add up whit the already realized c_{max}, so here is a possible explanation for the lack of antimatter and for the inflationary expansion of the universe at the supposed beginning of the world, postulated by Lemaître, doctor of physics, however, not accidentally also the doctor of theology—he postulated, and humanity still **homocentrically** insists on his Primeval Atom. What has not been annihilated in the meantime—is separated by inflationary expansion. Here is a possible explanation also for the dark energy that cannot be explained by any negative space-time

curve, cannot by any correction of Friedman's result, because this is probably a problem of the view only from one point of one historical period of the cosmos—in which, contrary to any big bang, the metric aligns by the radiation of stars. And so on.

Whoever carefully reads Einstein's work from 1905, "*Ist die Trägheit eines Körpers von seinem Energieinhalt abhängig?*" will notice that Einstein actually uses three coordinate systems: one from which the electromagnetic energy L (German **L**icht) radiates, the second which moves in relation to the first with a speed v and which receives that energy L, and the third which serves as a reference—the situation similar to that of the three coordinate systems that Georg Bernhardt explicitly analyzes, so he too is subject to homocentrism without seeing cyclical symmetry. The only difference is that with Einstein, the system S, v = 0 is tied to the gravity center of our Galaxy as if its mass M the mass of the whole world, and the systems S' and S'' are tied to insignificantly small masses m1 and m2, moving at negligibly low speeds regarding to the light speed, $v', v'' \ll c$. In these circumstances,[6)] Einstein, developing into a binomial series the obtained root

$\sqrt{1-\frac{v^2}{c^2}}$, retains, of course, already on the term v^2/c^2, so the formula $E = mc^2$ is reached, and confirmed by the atomic bomb.

This idea, that the whole world has its starting point from which the Big Bang exploded, humanity still strives to maintain: starting from a single coordinate origin, to harmonize, for example, Friedman's radius of curvature with astronomical observations by varying diverse parameters or adding them into Einstein's equation of gravitational field. As early as 1916, Einstein himself, in his popular science book **ON THE SPECIAL AND GENERAL THEORY OF RELATIVITY** calculated even the radius of the cosmos.

And so the opportunity for dogma remained: both for the dogma of God and for the dogma of Matter. If the infinite omnipresent God is the omnipotent creator of the World, then really why not a single Big Bang? If, on the other hand, Matter without God is infinite, then why not also in different and increasingly distant galaxies, it doesn't matter whether people see them or not.

The fact that K. Shimizu took into consideration Schwarzschild's spherical space--time metric does say anything neither about God or Matter. The question remains:

„Warum ist überhaupt Seiendes und nicht vielmehr Nichts?"

Martin Heidegger

Hegel, Sima Milošević and Justin Popović

To the question asked, one could simply say: Because both **Nothing and Some-**

thing are in mutually conditioned **relativity and the symmetry of becoming and disappearing.**

The history of human thought and philosophy is a sea without shores; here are the only stronghold and measure over and again the material circumstances of human history itself—and Nature. In the post-Hegelian era, when dialectical materialism was emerging, historical reflections on political economy corresponded to the name of **dialectics**: everything changes and develops from itself, constantly moving from its own opposites by the transition from quantity to quality. Hegel attributes this dialectic of his philosophy to the absolute Idea, not Platonic about this or that thing, but the Idea as the logic of both Being and Non-Being, on the basis of which the whole world exists. In short, the absolute idea is God, if anyone really demanded to be translated into the language of religion. And, of course, the Church demanded it and did not only demand, but also criticized Hegel because of the dialectic. In that context, materialism made sense. It should have been clearly stated: no God, no any thought that would exist without human being and impose itself on it in the name of God.

Sima Marković[7)]—who can be considered the representative of dialectical materialism from the time when it was still a true philosophy and not the dogma—in his book **THE PRINCIPLE OF CAUSALITY AND MODERN PHYSICS**, criticizing Hegel, he wrote, however, this: "*In Hegel, the idea, alienating itself, passes into nature, so that nature is a kind of realization of logic*"... So what is not true here? As if nature is not **realization** of some kind of logic, **its own logic**, whatever we call it?! Why did he talk about Hegel as if here were something that would not be true?

And then I read **CHRISTIAN DOGMATICS** by Justin Popović[8)] who wrote this about Hegel: "*Hegel considers the Deity as a pure Idea, as a pure thought activity and knowledge. But since knowledge presupposes the object of knowledge, God from the eternity of Himself distinguishes the knowledge and gives birth to Himself as the Son, and at the same time knows Himself as one or equal to Himself, that is Spirit. In Hegel's system, neither the Son nor the Spirit is considered eternal persons of the Deity. In Hegel's system, God is—an eternal idea. That idea, in abstract form, unfulfilled, is—the Father; when he separates into appearance, into the exterior of nature, it is—the Son; and when he returns from the phenomenon to the final spirit and to self-knowledge, it is—the Holy Spirit.*"

No one has interpreted Hegel more succinctly and in his own way accurately and consistently—however, in the section on *Anti-Trinitarian Heresy*. That is why Sima Marković did not speak differently about Hegel but that way: **dogma against dogma**.

Yes, Hegel called his absolute Idea pure Thought, not human but pure, therefore, God. But it is absolute and pure because the dialectical unity of Being and Non-being is

the inner logic of all Nature; hence the title **SCIENCE OF LOGIC,** with Hegel, logic is actually ontology.

And so humanity remained in homocentrism.

The Catholic Church, however, declared Thomas a saint some fifty years after his death, and little by little it proclaimed his metaphorical interpretation of the Bible as its official teaching, and in 1951 recognized the evolution of the cosmos. Then a congress of scientists on that topic was organized by the Catholic Church. But the Pope gave them an introductory speech: let them analyze as much as possible the evolution after the Big Bang, but let them know that the Big Bang is the work of God. The Catholic Church finally recognized Kant's philosophy, which needed God only as the First Mover, however, otherwise attacked him because of the hypothesis about the origin of the Solar System (Kant Laplace's hypothesis).

And so the question remains:

How to overcome homocentrism, how through singularity? [9)]

Notes and references

[1] It is interesting that Einstein himself has a work that speaks in its own way about this unique inertia of mass and vacuum: *Das Prinzip der Erhaltung der Schwerpunktsbewegung und die Trägheit der Energie*, ANNALEN DER PHYSIK 1906, Band 20, Seite 627 – 633

[2] Georg Bernhardt: *Zum Zwillingsparadoxon in der Speziellen Relativitätstheorie*, http://docplayer.org/73001920-Zum-zwillingsparadoxon-in-der-speziellen-relativitaetstheorie.html

The article looks at three inertial coordinate systems S, S' and S". At the beginning, two mathematical points in the system S are in the same place. Then one instantly jumps into the system S' moving at speed +v, and after some time, jumping into the system S" moving at speed -v, it returns to the system S. When, according to the Lorentz transformations, the time of departure and return is calculated, from whichever system is calculated, the result is the same: most of the time has elapsed in the system S which was at rest.

Since the choice of the system at rest is arbitrary, it is a matter of cyclic symmetry.

[3] Milan D. Nešić: *There Is No Coordinate System without Mass: https://vixra.org/pdf/1908.0204v1.pdf*

[4] Beograd, ISBN 978-96-903835-8-7.

[5] Aug 2016, https://arxiv.org/pdf/1608.05264v3.pdf.

[6] Otherwise, for $v = c$, as is approximately the case with the velocities of the farthest quasars, this series leads to infinity. Does that call into question the mathematical prediction of singularities with zero and infinity not only in the center of black holes? (Hawking, Penrose). And is exactly that what goes in favor of relativistic gravity, however, without certain units of length and time per se? Nikodem Poplawski: *Affine Theory of Gravitation:*

https://arxiv.org/abs/1203.0294v2, August 3, 2012. With the conclusion that "*the concept of* ***graviton*** *as elementary particle associated with metric and mediating the gravitational force becomes* ***unphysical***."

Is the fact that the stated binomial series is not convergent related at all and in what way to the explanation of gravity by entropy? Erik Verlinde: *On the Origin of Gravity and the Laws of Newton* — https://arXiv:1001.0785v1, January 6, 2010. Nothing is said here about the transfer speed of entropy information, but the Planck length, that is, light speed tacitly is used to derive the relativistic force of gravity. Since due to c^2-inertia the vacuum, as an infinite indeterminacy, is one and unique, isn't it here a word about virtual photons? So it seems that the action on field (real, speed c_{max}) and the action on distance (virtual, higher speed than c_{max}) are **also in mutual relativity and symmetry**. It also seems that this theory is correct because at large distances it predicts a decrease in the force of gravity not with $1/r^2$ but more slowly, with $1/r$, which could explain the dark energy.

[7] Born in Kragujevac in 1888, he was accused of right-wing Trotskyism and espionage and **shot** in 1939 in Moscow, where he fled Serbia as one of the founders of the CPY and a member of the executive committee of the Comintern due to the *Law on State Protection*. Rehabilitated in 1958.

[8] Born in Vranje in 1894, he died in the monastery of Ćelija in 1979. In 1932, he published this trilogy entitled **CHRISTIAN DOGMATICS**.

[9] How to overcome homocentrism, how through singularity?

The inertia of the whole cosmos $c^2 = \text{const}$, whereby the atom is always rebuilt from the vacuum, so mass, in addition to explaining the postulate $c = \text{const}$, can explain many other things, for example why teleportation is not possible, but cannot — how come the World of mass exists at all. Not such a way, isn't it, that before the Beginning there was nothing, and then, at once, there is the whole world so that there would be a man in it with that beginning as with God! After all, which man when it is c_{max}- measure starting from every material point, from any singularity in general.

Instead of the internal logic of the Big Bang, it is more accurate to say **the internal logic of Nature**. First of all, the very possibility of the existence of the World, this is **virtuality**. In relativistic quantum electrodynamics, virtual photons still affect real results of calculations, verifiable by experiments. That possibility, that virtuality of vacuum is always and forever, this is **inertia**. Not only one elementary possibility, which exactly, why not the opposite one of it, the second, the third, without measure and end—here is symmetry, here is also relativity. **Relativity** is the basic driving force of the whole universe, **symmetry** is the basic law. The vacuum is one, but not the one state; otherwise the entropy would be zero. Everything would stop, where; when—**there is no reason for any certainty.** There are infinitely many elementary possibilities in all directions, all speeds and accelerations to infinity, at the same moment everywhere—and each photon in its virtual coordinate system. The possibility is getting bigger and bigger, quantity, quantity—all the way to its ultimate determination, here, now. Infinite virtual relativity would not be infinite if it did not refer to itself, in that collision with itself is its limit, the transition **to a new quality—to reality**. That limit is, let's call it, Bose's volume, a certain coordinate system. According to it, this otherwise indefinitely c_{max} is now calculated. It shows that relativity is actually temperature, the higher the relativity in the smaller volume, the higher the temperature.

However, Bose's volume? Homocentrism again!

Bose began his statistical derivation of Planck's radiation law with the words: “Let the radiation be enclosed in a volume ΔV and its total energy be ΔE”, the photons are now of constant c_{max}, so the real ones—the real energy of ideal photon gas. However, if there is no man (homo), then who does determine that coordinate system and that volume, God personally?

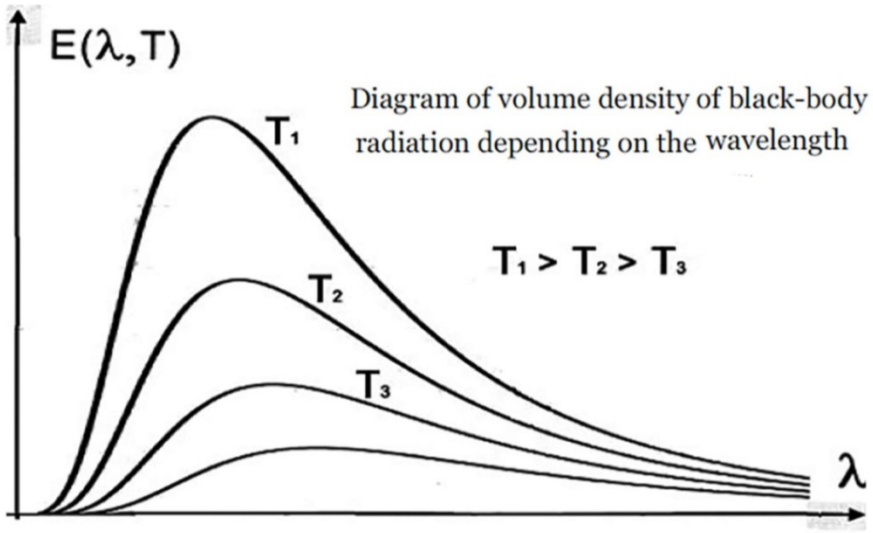
Almost like that. The inner Logic (Logos) of Nature does it determine.

Again relativity, always in the dialectical unity of opposites: in the core of stars due to the fusion of hydrogen into helium there is temperature and its pressure against the force of gravity; temperature against gravity now due to the fusion of helium into carbon. And so on until to the iron and the gravitational collapse into black hole. No photons can come out of the black hole anymore.

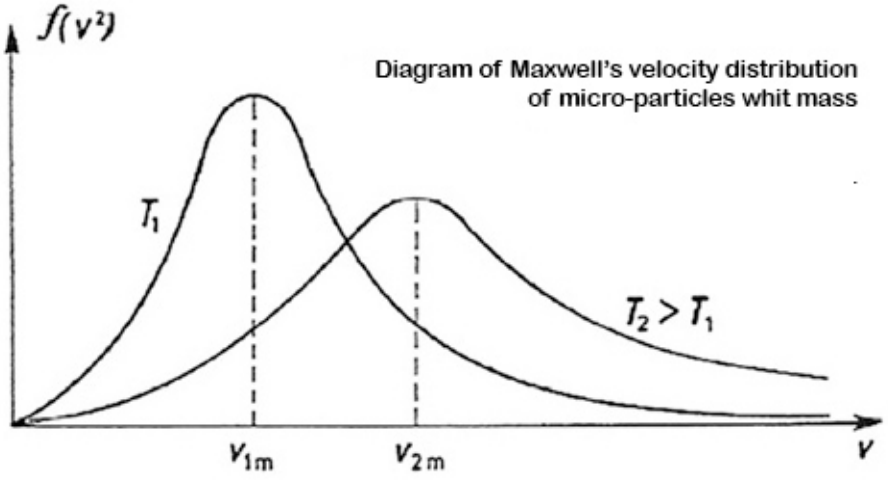
Why shouldn't some black holes with huge masses sometimes collapse gravitationally and, reduced to a singular state, finally explode entropically? And here, therefor, again relativity: nowhere one single state forever, not a single elementary particle without a symmetrical second, third, that is: again this eternal and infinite vacuum in unity with all the newly realized particles–and finally the macro-world.

The first following figure shows the diagram of Planck's law of black body radiation—equation (7)—and the second figure diagram Maxwell's distribution of velocity of

micro - particles with mass — equation (8):



$$E(\lambda,T) = \frac{8\pi hc^2}{\lambda^5}\frac{1}{e^{\frac{hc}{\lambda kT}}-1} \tag{7}$$



$$f(v^2) = \frac{dN}{N}\frac{1}{dE_k} = \frac{2\sqrt{E_k}}{(\pi kT)^{\frac{3}{2}}}e^{-\frac{E_k}{kT}} \tag{8}$$

Similar diagrams, both bell-shaped. Both with the exponent of the natural number e, where all velocities and all accelerations are equally possible, mathematically: all derivatives of the e^x-function are the same wherever the coordinate origin was — in accordance with the fact that the force of entropy arises in a singularity as the coordinate origin and then with the range to infinity. Both Maxwell in 1860 and Bose in 1924 started their derivation of formulas from the same assumptions, from a homogeneous and isotropic vacuum space, spherically symmetric, Maxwell from the coordinates themselves:

$x^2 + y^2 + z^2 = r^2$, and Bose from photon pulses $p_x^2 + p_y^2 + p_z^2 = c^2$ (arbitrary r, and constant c).

Well, can one reduce the volume of particles without mass by going through the singularity (0, ∞) and ultimately obtain Maxwell's thermal velocity distribution now of particles with mass? The velocity distribution of probability that would show the property of the same **relativity** and the same **symmetry**: whatever which mass, particle with mass chosen for the coordinate origin, the bell-shaped diagram remains the same. Is it possible, mathematically? It should be possible. However, how? How, when the only way for a person to get rid of his homocentrism is to omit from the account not only the Earth (so as not to be geocentrism) and the Sun (heliocentrism) as well as real fixed stars in general (fixed Ether), but also his own mass. Otherwise — even if a person were single in the universe, at least the mass of its eye would be what the c_{max} is determined by.

The coordinate system, therefore, must be equally bound to a particle without mass — that is the solution: bound also to a quantum without mass, to photons. Only with that, after all, the theory of relativity did complete its basic postulate that all coordinate systems are equal; so when that or this, which is more suitable for an application, but always with the thought that everyone is possible. And photons by themselves have no measure, no time neither coordinates, that's appropriate here. Therefore, in Figure 1, it is not Planck's law with spatial coordinates, but with wavelengths. Photons themselves, with their increasing relativity, reduce the “volume”. Relativity itself in its own collision transforms itself into a new quality. Otherwise it would not be eternal. And relativity, it is temperature, a multitude of arbitrary quanta of only possible energy, a virtual energy that does not have its absolute zero which is also relative — and in fact it is everywhere. How then to reduce the “volume” in the diagram when there is no volume at all? By raising the temperature.

The numerical values of the h, c and k constants are such that, for example, at room temperature $hc/\lambda kT \gg 1$, even with the largest wavelength of visible light. Hence, instead of the $\mathbf{e^x - 1}$ function, it is appropriate simply to write $\mathbf{e^x}$. Due to Wien's law of displacement $\lambda_{max} T = b$, i.e. due to $hc/kb = 4.98$, this approximation is appropriate for any temperature in general, so the $E(\lambda, T)$ diagram is proportional to $\mathbf{e^{-x}}$. As the temperature rises, however, how fast will the wavelength decrease, is it faster than the temperature rises? According to the same law, the ratio of frequency and temperature is equal to the ratio of the enormous light speed c and t Wien’s tiny b-constant: the frequency will increase incomparably faster and the wavelength will decrease than the temperature will rise — all the way to micro-domain and uncertainty when mass formation begins anyway. Increasing temperatures will, therefore, undoubtedly lead the entire diagram to a single line: the 0-singularity; in the singularity of the entropy explosion with a range to infinity.

On the other side of the singularity is the Maxwell-Bolzmann velocity distribution of particles with mass. When an entropy has already exploded, then the probability of a particle with mass at the point of the explosion, at the coordinate origin, of course, tends zero. At the micro-level, it is a chance, in fact, only vacuum remains, so virtuality. But when the world of mass has already been created, at the macro-level it is causality: a certain cause, a certain consequence, always to infinity, that is — if there were no relativity: somewhere in infinity again explosions of singularities. Maybe in a black hole, maybe with different constants h, c_{max} and k?

Some different *Cosmos*, as the ancient Greeks used to put it. Some different *World*, the one from Giordano Bruno's treatise **ON UNIVERSE, INFINITY AND WORLDS.** The Church's Inquisition burned Giordano in 1600 — at a time when the doctrines of Thomas Aquinas were already spreading in Europe, the doctrine that God from the Holy Scriptures should be understood metaphorically. Century after century, that doctrine has finally become the official doctrine of the Church. In 1951, the Pope made the Big Bang official as a work of God. Thus, the Church recognized Kant's doctrine on the first mover and Hegel's dialectical development, that is evolution. There was no atomic bomb in the time of Thomas, Giordano, Kant and Hegel. With the atomic bomb, however, it is necessary to know: neither burning nor shooting in the name of revolution can stop or skip evolution. Quantity, quantity, and only so a new quality. It is not the last contradiction of civilization that between profit and labor, in the name of God or without God. The contradiction is in human being itself, as a subject and as an object. As a subject, human being is faced with its **relativity**, and yet it would like eternity like infinite **inertia** or God — even though he/she is already an object to human being next to him/her.

By recognizing homocentism, scientists would help to overcome egoism in the name of humanity and nature — no matter who worshiped which God or who protected himself with which God.