# Universe, Inertia And Universal Constants

**Milan D. Nešić** – Independent researcher
(Belgrade, Serbia)
E-mail: univerzumkaorelativnanula@gmail.com

## Abstract

If Feynman 1985 announced that he only describes how nature behaves and that nobody understands why it behaves that way – **QED: The Strange Theory of Light and Matter** – and Laughlin 2005 that it is necessary to build a new physics basically – **A DIFFERENT UNIVERSE: Reinventing Physics From The Bottom Down** – then a real understanding of the postulate $c = \text{const}$ as $c^2$ inertia of whole Universe is finally the opportunity for it. And all the laws of physics remain; only cosmology is basically changing. There is no single mass of the same origin, there is no "Big Bang" as the beginning, and that can also explain dark energy. And even new opportunities for further research open up. And the passing of Planck's law of black-body radiation through singularity by decreasing, let's say, the volume of Bose to zero, and the transition to Maxwell-Boltzmann's distribution of velocity can be a good example or at least a clue to these new possibilities.

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## Content:

## Introduction

When we said UNIVERSE, we said EVERYTHING.

When we said everything, we did not say anything definite, let alone something individually. So, as if we said NOTHING. Or nothing more than that this world exists.

But there must be a difference. The universe is, however, something more than THIS WORLD. This world, what we see together with the night sky, and in fact the night sky with all the stars and stars, the old Grey called COSMOS. The universe is something more: and what we can not see, what we can only imagine, even what we can not imagine, it's simply EVERYTHING. Infinite, **totally undefined everything, real infinity is utterly indefinite infinity** – unlike the infinity of this world, what we see, for example, from here to any star and everything else to full blackness in the sky, which is the infinity of any individual look in the cosmos. In order to avoid any subjectivity, we will say: infinity starting from any mass so as long as it is in any direction, this is cosmic infinity in terms of old Greeks, **the individual infinity**. But the universe is also what is behind any individual mass and its $c_{max}$-horizon. What's more, the vacuum itself is the universe whatever carrying with itself. Vacuum as indefinite infinity. There is nowhere its o-beginning, nowhere any beginning or end, neither any certain direction. It is **an infinite indefiniteness, which, as such, does not need any reason to be or not to be.**

What can we nevertheless conclude from this, concretely, if we are already here as certain people, with all our individualities and the horizon of our own cosmos?

**First:** everything passes and everything can fail; only the universe can not, it is since always and forever, or, in other words, it is not to be created and it is indestructible. Hence **inertia.**

**Second**: each and even the least specific something, and even as a mere possibility, is one of the infinitely many, so the relative one. Hence **relativity**.

**Third:** When something is already the specific and determined one, already such a relative individuality, why it would not be such but the other one? Exactly because relating to such one, the other is also relative: not the same but in opposite. Hence the symmetry.

So, from the universe as inertial constant—both relativity and symmetry do originate.

Can what from this further be concretized?

## Einstein and his c = const

In 1905, Einstein, for the reason of translator symmetry + v and -v and with the already available Lorentz transformation, postulated c = const in all inertial coordinate systems.

After all, even if he did not know about the negative result of Michelson-Morley experiment, the experimental measurements undoubtedly showed that both the dielectric $\varepsilon_o$ and the magnetic $\mu_o$ vacuum permeability were the same $c^2 = 1/\varepsilon_o\mu_o$, wherever on the Earth they were measured and somehow the Earth moved through the universe. But the example given in 1911 in a lecture as an illustration of the special theory of relativity—today known as the twin paradox—shows that Einstein could not explain his c = const. Why should any twin who stayed on Earth be older than any twin brother just because he flew off *at about the speed of light*, then changing the direction he returned at the same speed? Why when the brother who flying to and fro also does not move in his coordinate system? In relation to him, on the contrary, the one who remained on Earth leaves and returns. So, in the case of a re-encounter, he had to be younger and not older. That same year the paradox was noticed and the discussion about him still continues today, all on the track of Einstein's erroneous explanation: symmetry was broken because the brother who stayed on Earth did not suffer acceleration while the other one did. It is tacitly assumed, however, that at least for this occasion Earth is an absolute coordinate system, [1] perhaps because it has an incomparably greater mass than a man—as if the special theory of relativity treats the mass, as if Maxwell's wave equation of propagation of light does not contain only length and time! This "explanation" only aggravates the paradox because the incomparably larger mass, however, has the Sun from the Earth, here is, therefore, this absolute coordinate system, and finally, of course, not even here, but it would have to be in an infinitely large mass, even at all in one dot—from which the "big bang" has become the whole world, and nevertheless whether it then infinitely broadens or alternates, so it collects again to that point of its absolute beginning.

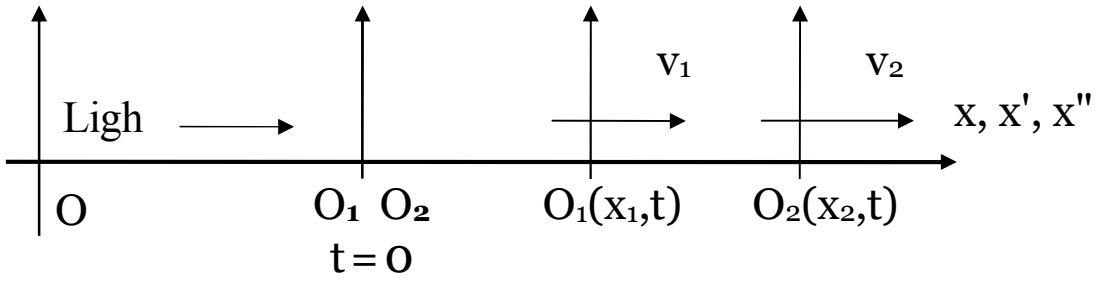
In 1916, Einstein again tried to explain his c = const with his famous train on the embankment and lightning, again tacitly starting from the assumption that the Earth at least for this purpose is an absolute coordinate system. So, wrong. No wonder. At the time, c = const could not be explained. The wave nature of the electrons was postulated not until 1924 and experimentally confirmed in 1927, the same year when Heisenberg published his uncertainty relations. Strange is something else that ones, even today, at least at popular lectures, insist on the twin paradox as if it were really a paradox, although the solution is trivial: from as many inertial coordinate systems as each other's moving at whatever speed, the fastest time will flow in that, which one chooses to stand still—because only in relation to it all the speeds are calculated as absolute, while the speeds of all other systems compile relativistic with each other, thus with a $c_{max}$-speed in relation to the chosen one. It is also strange that ones are insisting on this wrong Einstein's explanation with the train and

lightning as if what Feynman said in 1985 was true today: that the behavior of light, this c=const does not understand anybody. Or, really, no one has ever realized that at the level of already realized masses, this c=const can not be explained? Because

## At macro level c=const is objectively inexplicable

That is, if a man homocentrically persists on the coordinate system in which he is at rest or which he chose to stand still, he becomes stuck in elementary contradiction.

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 that measured in the system which emitted the light: up to $x_1$ and up to $x_2$. **Elementary contradiction,** which suggests that one can not stay homocentric with the broadcast system.

It is necessary to separate: the one event is the broadcasting and the propagation of light and the other is the propagation and reception of light. In particular, that part of the flash light that received the coordinate system $O_1$ is not the same as the one that received the $O_2$ system. Moreover, no matter how many coordinate systems $O_n$ are mutually arbitrarily moving, n = 1, 2, 3, 4, etc., each one will **differently** receive its part of the light flash **from the same** emitter. Of course, this is not only about the Doppler Effect, but also about this strange c-constant behavior of light.[2]

## c = const on the micro level and inertia of the universe

First of all, we must state the fact:

**Not even all the photons of the same frequency from the same light source are the same; each of them will be such, so that it arrives to its receiver with the c = const speed.**

How is that possible, certainly not in a way that the photon **knows** in advance in which receiver it will be caught, so that it already by emitting goes into the receiver's coordinate system, adjusting its speed to that system? It would be *a ghostly remote* knowledge, as Einstein would ironically say.

**Elementary contradiction,** which suggests that one can not stay homocentric with the broadcast system. Atom-emitter, emitting a photon at the expense of its mass $\Delta m$, lost part $c^2\Delta m$ of the energy by passing it to the vacuum, $\Delta E = h\nu$. But now it is not just the vacuum energy, but it is still the energy of the universe, potentially, also of any available atom in the universe anywhere. It is no coincidence that the term $h\nu$ does not contain any length, which is, according to the relativity theory, **relative**, but Planck's constant, which is **universal**. Moreover, having lost the foothold of the atom of the emitter, the photon does not have any unit of time, it does not have a certain frequency, its energy is indefinite, so this indefiniteness is (already here can be surmised) **due to inertia** of universe, of the universe that, as a completely indeterminate infinity, does not need any reason to be or not to be (as we have said at the beginning), so with this indeterminacy, also in this detail, it retains the possibility of balance **in symmetry**. Once emitted, therefore, the photon **does not know** in which receiver will be caught and whether it will be caught at all or remain an indefinable possibility in itself without any energy, just virtuality. But this World exists. At receiving in a new atom-mass, the photon will disclose the exact energy delivered by adjusting its own frequency and speed to units of time and length of the receiving mass. And this in such a way that according to the law of the inertia of the whole existing world, the square of its integral velocity for all the time while it was only virtuality is $c^2$, and its $\Delta$-contribution to the receiving mass is exactly according to Einstein's formula $E = mc^2$, i.e.

$$c^2 = \frac{h\nu'}{\Delta m'} = \frac{h\nu''}{\Delta m''} = \frac{h\nu'''}{\Delta m'''} = \text{itd...} = \text{const} \qquad (1)$$

**This integral $c^2$-inertia of the entire universe explains c = const.** And how, this describes Heisenberg's uncertainty relations. At reception, there is a precisely determined place where the photon is, therefore there is no uncertainty for the place. At reception, therefore, there is an uncertainty of speed, it is infinite, the speed of light can be any, and

larger and smaller than c. Recall how Feynman illustrates the calculations of the least action by an integral function, and the calculations in quantum electrodynamics are the most accurate in physics in general. First, he assumes the receiving coordinate system, the receiving atom, and its reception frequency. And then starting from the light source, he looks at all possible paths to the receiver, each photon with that predetermined frequency not only straightforwardly, but also curved, more or less indirectly, whatever the way. And in the receiver after time t a unique result: different paths, different phase, so the interference is the result. Pay attention: Longer or shorter paths and the incoming one moment t is the same. It means that the photon did not have a certain speed until it was realized. It means that it has been shown only in reception that the certain and constant c is integral velocity, while the path of light is straight-line – because all the other paths of the photon cancel each other at interference due to symmetry. I. e. if there are no obstacles, so symmetry is possible. Otherwise, if the light passes, for example, through a mesh barrier, an interference pattern appears. And in the case of a single photon, there is only one dot, but not necessarily rectilinear, than such a way as if the photon could pass through any hole or slit, however, the greater the deviation from the straight line, the less likely. Moreover, there have long been known experiments in which photon has no specific location until the final materialization: not only the experiment with the EPR paradox, but also the one that is already classical with a semi-transparent mirror and two of it at an angle of $45^{o}$ displaced parallel and symmetrically arranged mirrors, and only then the indicator between them,[3] the experiment showing interference even for one single photon: as if the photon went through and did not go through the semi-transparent mirror.

Yes, c = const can not be understood if relativity is not brought to its end: not only curvilinear coordinate systems related to the mass, wherever to the arbitrarily small one, but also coordinate systems related to a particle without mass, which are photons. Since Lorenz's root is zero if v = c, in its own photon coordinate system all (wave) lengths are infinite, $\lambda \rightarrow \infty$, as if photon is in the same time (the probable one) everywhere, which is the property of virtuality. Only from this uncertainty $\infty$ o it is possible to accomplish the definite length in any coordinate system of the already materialized world, which, however, has its own measure of length. As also any particular measure of time from indefinable $^{o}/_{o}$. Because in its own photon coordinate system time does not flow. Not at all from t = o to go, the photon does not have a frequency per se. Only with the receiving mass and the coordinate system related to it, that time begins. As in the beginning, we talk about a vacuum: *there is nowhere its o-beginning, nowhere any beginning, neither the end nor any defined direction, it is* ***an infinite indefiniteness.***

In the considered case of the light flash from the Ox-coordinate system, at the beginning, it is synchronized in all three coordinate systems, $t_o = 0$. At a later time t, measured from the broadcast system, both mobile systems capture their photons. But because of relativity, that moment no longer coincides with the corresponding moments in moving systems, but is $t > t' > t''$.

## On universal constants instead of the conclusion

The fact that the velocity of light is a universal constant, it can be seen already at first glance, already in the first approximation, so mathematicians would say. Because for this material world to exist, let's mark it with M, there must first be a possibility that it exists, mark it with E as energy. And since all human thought through the history of humanity has agreed that this possibility has always been, forever and eternal, or not-created and indestructible, whether it be God of the Middle Ages scholastics or Matter of the XIX century, there left nothing else than to conclude that the probability of existence of the world is constant, $M/E = \text{const}$. Exactly what Einstein came to, $M/E = 1/c^2$. At the time when in 1917 he wrote his *Cosmological Considerations*, assuming that all mass of the world M is of our Galaxy, the unique one because all the speeds in it are negligible compared to the speed of light, since it was not known that the other galaxies exist, he had to stay on that first approximation. Today, however, we know that there are not only other galaxies moving at speeds comparable to the speed of light, but also other universal constants, it is time for the approximation of higher order. First of all, the mass of the world M is not unique, and each mass $m_o$ corresponds to its own cosmic horizon $c_{max}$. Then $c = \text{const}$ should be understood as $c^2$-inertia.

However, although the mass is not the measure of inertia, it is not possible to define inertia without it. At least the minimum rest mass $m_o$ is needed, in order to be able to realize at all the $c^2 = \text{const}$, and therefore time and length. At least one atom. Until recently, krypton was used for the definition of one meter: a million and exactly as many wavelengths of the orange red emission line from the spectrum of its isotope 86. Today, cesium 133 is used in atomic clocks: one second, that is 9.192.631.770 twinkles $\nu_o$ due to the transition of the electron from the precisely this to the lower precisely that atomic level. And then choose how much wavelengths $c/\nu_o$ as the unit of length will be. For atoms and atomic levels, however, the Planck's constant h is required, also universal. Without it, it could not be the $c^2$-constant. Why, therefore, do not $c^2/h = \text{const}$ as the measure of inertia? In the theory of relativity, the classical Newtonian force $F = ma$ mathematically converts to the Minkowski's force $\mathbf{F} = c_2 m_o \mathbf{a}$, where both force **F** and acceleration **a** are four-dimensional vectors in a unified

space-time. The time is relative, so both speed and acceleration are more easy to define as an derivation per interval-distance $S_{1,2}$ between two events (two points in that space-time x, y, z, t), since this interval is invariant by Lorenz transformation, no matter for which mass $m_o$ was bound the coordinate system at any relative velocity $v < c_{max}$. And this is a dilemma: the mass $m_o$ is arbitrary, it can be any, and yet it is $c_{max}$ in relation to it determined. This would limit the vacuum itself, the vacuum for which it was initially said that ***there is nowhere its 0-beginning, nowhere any beginning or end, neither any certain direction.*** But! The differential of the interval on the possible path of a photon for any already realized mass $m_o$ and already realized c = const is always zero,

$$ds = cdt\sqrt{1-\frac{v^2}{c^2}} = 0, \qquad (2)$$

So, wherever and whenever a photon is emitted ($x_1$, $y_1$, $z_1$, $t_1$), whenever and wherever it was caught ($x_2$, $y_2$, $z_2$, $t_2$), the interval between these two events will be zero. Once emitted, for photon it is all the same event. In its own coordinate system, its time does not run, that's exactly mathematically too. In the case, however, that there is no mass $m_o$, the photon will remain virtually forever.

However, this World does exist, how?

Relativity is the basic creative power of the entire universe. **According to the relativity there isn't any reason not for any particular specialty**, even for special virtuality of single photon, for example. All coordinate systems of these particles without mass are equal and possible, moving no matter whether rectilinear or irregularly curvilinear, no matter how fast, also with infinite speed. Therefore, it must **necessarily** happen that these virtualities collide **accidentally**. Mathematical: That the bell-shaped diagram of the Planck's radiation law with the mutual **relative** wavelengths of the photons, although in the absence of a mass without any definite length, passes through singularity – what we, the Earthlings, call infinite temperature; it is only relativity that led to the **BAAANG** explosion! In the new quality.[4]

From the same vacuum properties: homogeneity, isotropy and symmetry – of which Bose also began to derive the Planck's Law of black-body radiation – a multitude of various micro-mass $m_o$ is created according to Maxwell's law of velocity distribution, a mathematically similar bell-shaped diagram.[5] In the ever closer diagram of the bulk density of the radiation power, the more reasonable substitution is $\lambda T = b$ according to Wien's displacement law, up to an unspecified $0 \cdot \infty$ on ordinate with mathematically zero wavelength and infinite temperature. On the verge of being no longer virtual one, the total radiation

power according to Stefan-Boltzmann's law $\sigma T^4$ passes through the singularity into a set of newly created masses.[6] And what in the real world of the created masses will be disclosed as determined, it depends on this inexhaustible set of relative virtualities in a mutual crash. There is no reason for only constant σ to be determined, but other universal constants, c, h, Boltzmann's k, will get their real values.[7]

**A set of universal constants is the measure of inertia for a certain cosmos.** From case to case. And that would mean that there was not just one "Big Bang", and also that in the black depths of the Universe they are always possible again. Here are the indications for the hypothesis of the **M**axwell-**N**ewton postulate of a diamass-displacement of vacuum analogically to Maxwell dielectric displacement: each newly created mass creates compensatory diamass-displacement of space-time metric of vacuum. Thus, the cosmos spreads inflationary preventing at least partial annihilation of matter: by repeated light speed, the remnant of the antimatter is pushed behind the original $c_{max}$ -horizon.[8] This is where the **so-called dark energy** comes from.

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## References and notes

**1** In his short article **Dialog über Einwände gegen die Relativitäts-theorie**, DIE NATURWISSENSCHAFTEN, 1918, HEFT 48, Einstein insists on this case by introducing the word asymmetry itself: The coordinate system K' that traveled and returned, it accelerated *with some external force*, this observed from the system K. Observed, however, from the system K' which now stands still, the system K as if falls *under the influence of the gravity*, that is, together with the Earth, etc.

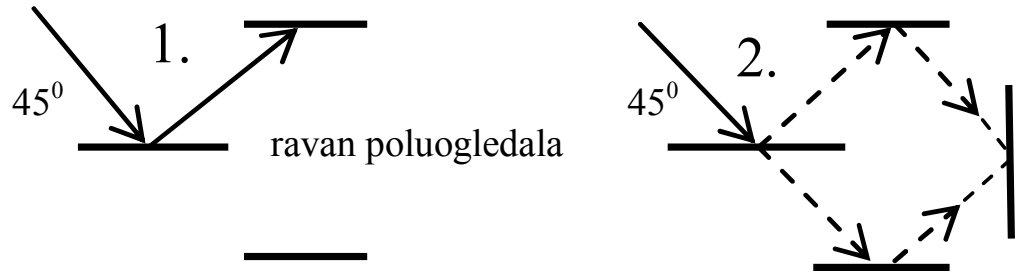
And the solution of the paradox is trivial: among as many inertial coordinate systems, the time will flow most quickly in one that the person chooses to stand still, as I already explained in my article **In Cosmology, $c^2$ = const Is the Measurement of Inertia, Not Mass**, http://vixra.org/pdf/1812.0230v1.pdf.

References to this article, as well as to the other at http**:**//vixra**.**org , I will not re-refer here.

**2** When the astronomers calculate the velocity of distant galaxies through red shift, they add at receiving in a classic waveform also the relativistic shortening,

$$\sqrt{1-\frac{v^2}{c^2}}$$

**3**




1) When the photon is operated at an angle of 45⁰ to the semi-mirror, it will either be reflected or passed through it, only on one of the two photographic plates will appear dark micro-spot – passed or did not, it passes or does not in its entirety. 2) But if mirrors are placed instead of these photographic plates, and farther a new photographic plate, no dark spot than a pale spot will appear on it – as if the photon was divided and the part that passed through the semi-mirror was lagging behind in the phase.

**4** Infinite variety of virtual photons all at one point. In other words, the infinite entropy through $ln1 = 0$ explodes to grow again. It is interesting what Hawking writes on April 12, 1975 in the article **Particle Creation by Black Holes**: *This shows that gravitational collapse converts the baryons and leptons in the collapsing body into entropy*. So, implosion in photons? Creation of real particles by the explosion of an invisible infinite multitude of virtual quanta, mathematically all at one point? We could call this type of "black hole" a "big bang".

**5** As indicated in the article **The Big Bang and its Internal Logic: the Universe as Relative Zero**,

http://vixra.org/pdf/1811.0497v1.pdf

**6)** In my book **WAS GIORDANO BRUNO BURNED IN VAIN?** Belgrade, 2018, ISBN 978-86-900622-0-1, on page 126/127, I also wrote this:

"*A space for the creation of both mathematicians and physicists was opened.*

*At this pass through singularity, can they take into account the different Compton wavelengths of different particles? So that their number and temperature are noted, since it is the moment of newly created masses, and to form tables for each type of particles at an ever-increasing temperature? It does not matter that it temporarily diminishes with each new kind, how much, also this to record. Would these tables get*

*the same arrangement of light elements for the same pressure and temperature as Gamow got?"* George Gamow and associates of the 40s of the last century. *"Or is this an analytical matrix-account of passage through singularity impossible?"*

**7)** These random micro relations on quantum-level on the occasion of transition through the singularity, whether they as initial conditions determine the future attractors of all seemingly chaotic galaxies and the entire Worlds? By the way: Giordano Bruno and his debate **ON INFINITY, UNIVERSE AND WORLDS**.

## 8) MAXWELL-NEWTON POSTULATE OF DIAMASS VACUUM-DISPLACEMENT

**No mass can be created anywhere, if the same amount of mass in the form of a diamass vacuum-displacement does not come out from that space**

That there is a diamass vacuum-displacement, this does not need to be specifically proven, the proof is by the fact that, according to the theory of relativity, the space-time metric is not Euclidean, but because of the mass and $c_{max}$ = const is curvilinear. This is also true with the classical theory: if around a central body of dominant mass circle the miniature masses, whose influence on the metric is negligible, and this body suddenly disappears and the metric tensor becomes Euclidean $g_{ik}$ (1, 1, 1, -1), it is obvious that all these miniature masses will straight-line continue the direction which each had. Einstein himself mathematically predicted gravitational waves. In September 2015, they were also experimentally stated. Two giant "black holes" spirally collided and lost 3 solar masses. This loss, therefore the loss, obviously brings closer the space-time metric to the Euclidean, similarly to the classical case described above. But this is not yet proof of Maxwell-Newton postulate, because of which the space-time metric changes at the speed of gravitational waves $\mathbf{c_{max}}$ ever again starting from the newly created mass. Classically, the situation when the central body suddenly, for example, doubles its mass could look like this: the miniature bodies on the circle around it are again in equilibrium or at the same distance, but with a $\sqrt{2}$ times higher speed, or at the same speed, but at twice the greater distance. The outcome would, however, be somewhere between, because the diamass vacuum-displacement is exclusively radial and the change in tangential velocity could only be due to the temporary radial acceleration.

In 2011, the Nobel Prize in Physics (Saul Perlmutter, Adam Ries and Brian Schmidt) was assigned to discover that our cosmos expands with greater acceleration than according to Hubble's constant. The space-time metric, therefore, aspires to alignment. So is it that mass

of our cosmos get lost except by radiating stars and occasional explosions of supernovae also by the collapsing of black holes too? Or, on the contrary, somewhere occasionally it appears, perhaps in the cores of the so-called active galaxies, in which occasion, at great distances, as if the space time metric is also expanding—how does Friedman's equation allow also this possibility? All depends on the initial conditions. Whatever it is, it is clear that there must first be an implosion, for example, of a star that has come to the iron core by nuclear combustion, so that it can no longer resist the gravitational collapse, and, secondly, of neutron star in the "black hole". And since ***all the infinite multitude of the so called elementary particles, charged or uncharged, with or without mass, energy relevant or virtual etc is only, but the only mode in which vacuum can exist***—this means that first must come to the vacuum implosion—on which occasion these initial conditions are created.

There are for a long time excellent mathematical analyzes of the “black holes” from this side of horizon of already realized space-time metric. Hawking and Penrose have already proved that going along the geodesic line on this horizon one can get the singularity where the time-space metric is not defined, where, therefore, these initial conditions with the beginning of time and a certain space would only appear—in the explosion of that ***only mode in which vacuum can exist***. The vacuum that is otherwise homogeneous and isotropic. However, analyzes of what is happening behind the horizon of “black holes”, just where in the last (or first) implosion of the vacuum there is still no defined mass or any metric, these analyzes are missing. Again, we are going back to pass through the singularity of Planck's law of radiation by reducing, let's say, Bose's volume and by increasing temperature and bulk density of radiation. “*Let the radiation be enclosed in a volume* V *and its total energy be* E“, writes Bose at the beginning of his derivation in 1924. It was the ideal photon gas, but here it would be virtual plasma of all possible still undefined particles, only a mutually different quantum state and relative wavelengths from zero to infinity. So let me repeat the question: Is such an integral-matrix account possible, which would calculate a percentage of at least the newly created hydrogen, helium and lithium? Would and to what extent would it coincide with the percentages of Gamow and associates from the 40s?

Since beyond the horizon of the “black hole” we can not inspect, as well as in the undefined time “before the beginning of the world”, maybe we can mathematically describe that inner logic of “Big Bang”?