

# Gravity - the inertia of the World

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## Abstract

Mass as a characteristic of such qualities of the body as the gravity and inertia is not an intrinsic property of the body itself. Mass as a physical quantity determines and serves as measure of such properties as a inertial force (and gravity), arising in the bodies in response to the acceleration of their movements, essentially it is a reaction of bogies on the external influence, characterizing the degree of the physical connectedness of the our World, at different levels of its organization. Mass is the induced property which arises in response to acceleration of the body and retained in the body owing to acceleration and is changed with acceleration. The nature of this phenomenon, i.e. the gravitational and inertial masses, is one and indivisible is concluded to in the general (universal) connectedness of our world as a single global process of Creation and the reason is the acceleration of bodies in a system of bodies associated with the accelerated motion (divergence) of galaxies.

The whole world has inertia with respect to the motion of time. World time is absolute inertial frame throughout our universe.

Life and evolution are required to the acceleration in the inertial frame of reference (IFR) associated with world time. The phenomenon of "life" is a continuous struggle for time. In order to live, we should uninterruptedly to borrow time in loan from the Universe. We are changing energy in exchange for a time, and we are alive until we are spending the energy.

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## Foreword

Russian Academician **Lev Borisovich Okun** in a very interesting and useful study which has been presented in UFN (178, 5, May 2008.) under titled: «*Einstein's formula:  $E_0 = mc^2$ . The Lord is laughing, isn't he?*» [1] by comparing some of Einstein's views in historical perspective tried to clarify and point out mistakes inherent to both Einstein so and to his followers, who are internationally recognized experts in physics, dealing with understanding of the nature and interpretation of one of the most important physical quantities, notably mass.

Academician L.B. Okun outlined the purpose of his work as follows: "Only few physicists - experts in the field of elementary particle physics - know that the true formula of Einstein is  $E_0 = mc^2$ , where  $E_0$  - energy contained in the body at rest, and that **the body mass does not depend on the speed with which it moves** and, therefore, does not dependent on its kinetic energy (emphasized by  $E.F$ )". And the same time in the special theory of relativity (STR) "the energy and momentum of a freely moving body relate as  $E^2 - \mathbf{p}^2 c^2 = m^2 c^4$  where  $m$  - mass of the body."They also know, that this formula is not compatible with  $E = mc^2$ , but is compatible with  $E_0 = mc^2$ , as  $E_0$  - the value of  $E$  at  $\mathbf{p} = 0$ ).

In the writings and utterances of the recognized genius he discloses what cannot be logically explanation. And it is not the simple negligence which could to afford himself a recognized scientist. It is much more serious. Comes to mind a sad recognition of Einstein expressed in the sunset of his life, which is not mention by the author of the essay: "*You imagine that I regard my life's work with calm satisfaction. But a close look yields a completely different picture. I am not convinced of the certainty of a simple concept, and I am uncertain as to whether I was even on the right track.*" [2].

The respected scientist done useful work, albeit very late. But as they say, better late than never. However, unfortunately, the scientist did not answer one very important question which, I think, wandered in the head of everyone who read this work, namely, how can be explained such a frivolous behavior of such a venerable scholar in such serious matters? We have not heard this from the author of this review. Mr. Academician has expended many efforts of to soften unpleasant impression from it all. And author, in general, has done it successfully, but I have already said, the questions and dissatisfaction remain...The fact that things mentioned in the Mr. Okun's article are exactly the same case. The answer is simple: Einstein simply was not sure and doubted in those things which were discussed. I can not judge whether the amendments in understanding the nature and the properties of the mass, about which the author himself says (rank is not allow!), are true or not, but I shall express my views on the designated topic. (Unfortunately, I could not to get answers on the delivered questions directed in the adress of the author and also in the adress of the editorship of the journal, the member of which the respected author is.).

Judge for yourself.

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## 1. Introduction.

*"The nature itself is very simple, everything that contradicts this must be rejected."*

/ M.V. Lomonosov/.

*"A new theory is a child of time, not of authority."*

/ Francis Bacon /.

In the development of the ideas which are presented above we shall make a short, but the purposeful excursus to the classical mechanics.

For us, earthlings, gravity is by the most intimate and inseparable (after mother-in-law) "relative". Scientific understanding of this phenomenon, as is commonly believed, started since first half of 17th century when Galileo the first took in his hands the meter, the chronometer and the telescope and discovered a fundamental principle of nature - the principle of relativity. The state of Uniform and rectilinear motion is indistinguishable from state of rest. Constant movement of the body in a straight direction is the result of absence of force. In the absence of force the body velocity is constant. The force applied to the body forces a body to move with acceleration; force is related to acceleration (!), but not with the speed (as previously believed **Aristotle**).

**Descarte** in the "Principles of Philosophy" explained that object is resisting to the change of its state of motion: an object at rest will remain stationary until someone or something will not force it to move; an object moving at a constant speed along straight line, will always move thus until anyone or something will force it to change the speed or wind down with a straight line. But what the very concept "immobility" or "motion at a constant speed in a straight line" really means? Immobility or constant speed - from whose point of view? If the speed is not constant, is then with respect to what, or from whose point of view it is not constant? These questions remained unanswered.

**Newton** gave the answer: the object is to truly motionless if it is stationary with respect to the absolute space. Object is really moving if it moves with respect to an absolute space. And he concluded: the object is really accelerated when it is accelerated with respect to the absolute space.

In the formulation of Newton: *"Absolute space, in its own nature, without regard to anything whatsoever external, remains always similar and immovable."*

Absoluteness in the theory of Newton is also peculiar to nature of the time itself: "the time flows uniformly from its own nature, without reference to anything external."

**Leibniz's** space it's just a language to express the mutual arrangement of different objects. And without these things, i.e. without content, similarly the alphabet without the letters, the space has no independent existence. Leibniz said: *"I admit that there is a difference between the true absolute motion of the body and by simple relative change its position relative to the other body."*

So the lack of the opportunities and ways to determine the position of the bodies in the absolute sense induces one to describe the position of one body with respect to other material bodies to introduce conditional, relative frame of reference.

**Mach** tried to introduce some certainty. The force which you feel sitting in a coach of accelerating or decelerating of the train or in the elevator when it accelerates its movement, as follows from his argument, is the result of the collective impact of the all matter of the universe. **You feel the motion only when accelerating relative to the average distribution of matter present in space. Unlike of the abstract Newtonian system of reference (absolute space), the system of reference, which Mach has offered, can see everybody - this is the substance which is distributed in the space. But the question remains: to what to bind the movement?**

Variegated picture of the mutual influence of terrestrial and celestial bodies, which manifests itself in the attraction and the acceleration and depends on the spatial and temporal coordinates, led **Lorentz, Poincare**, and then **Minkowski** and **Einstein's** to the thought about the geometric (per se "conventional" - Poincare) association of space and time.

Space and time together in **Einstein's** special relativity are providing an almost Newtonian "scene" of the universe, but only as an indivisible "continuum" of space-time, where the absolute time and absolute space do not exist by themselves. But how to be with filling of space, about which Leibniz was talking, or with the universal mass "which has distributed throughout the cosmos" about which Mach was talking? Ten years it took for Einstein to tie it logically all together.

In Einstein's general theory of relativity the both gravity and acceleration - two sides of the same coin. The force of gravity and the force which you are feeling under action of the acceleration are not equal - decided the scientist - but equivalent. You feel force of gravity only when you are resisting it. Conversely, when you are do not resisting to gravity, you do not feel it. If during your free fall on you does not act against forces (eg air resistance), you feel yourself as if you are in the float freely in space, and about free-floating man nobody could say that he accelerating.

So in the special theory of relativity first the absolute space-time has appeared, and then in the general theory of relativity - the gravitational field. Einstein, in the words of John Wheeler, saw the world where *"mass manages by the space, speaking it how to distort, and the space manages by the mass, telling her how to move."*...

But here's the curious thing, by setting the standard for the state of rest, and in particular, establishing a frame of reference for determining the acceleration, no one of the above scientists did an attempt to explain why and how the physical bodies are resisting to acceleration. And more precisely, none of them tried to establish the nature of the mechanism by which the bodies has acquired the property resist acceleration.

It was only in the second half of the 20th century when British scientist **Peter Higgs** tried to answer this question. His idea was simple. There are quarks, electrons, have bodies made up of them, and there is "ocean" of Higgs with really magical properties into which all particles and bodies are immersed. Thus, Higgs an idea is that the universe is permeated by an invisible field, passing through which some elementary particles such as quarks and electrons are acquiring subatomic "bosons", and thereby mass, whereas others do not. Mystical Higgs boson is responsible for a mass in the universe.

In the past, we didn't have a problem with it. We have ascribed the property of gravity and inertia to mass itself and were speaking that the mass is an intrinsic property of the body itself, which determines the body's ability to resist to the change in position, speed and direction of movement. We did not think from where this mass had appeared? Higgs theory argues that elementary particles acquire mass (weight, inertia) as a result of their interaction with the ubiquitous ocean of Higgs. And that's the point!? To search for and identify the "God particle" the efforts of the experimentators and big funds were directed. Doubtful experimental success in this affair hurried up to fasten by the Nobel Prize. To this question we shall return later.

For completeness of the picture, it should mention one more peculiar theory. Today, the Dutch scientist **Erik Verlinde** explains the emergence of gravity by the action of the "entropic force" and the changing of information related to the movement of material bodies and their ordering. Entropic nature of gravity, according to the author, indicates that mass is a form of preservation of the ordered energy or keeping information. *"We have suppose for a long time that the gravity does not exist, - said Dr. Verlinde. - It's time to shout about it. "*

The reduction of the wave function (R-procedure) of quantum mechanics could be connected with the effect of gravity - this thought timidly **Penrose** has expressed.

## 2. "Pedigree" of the mass.

Nature has a wonderful property, ie by the ability of physical bodies under certain conditions maintain, as they say, "a state of rest or the uniform rectilinear motion," that since the time of Galileo-Newton has been called inertia. The bodies posses by this property in varying degrees. The scientists gave it the name of mass, and designated by the letter  $m$  in the formulas. The essence hidden from our eyes, have attributed the property of inertia. But there also is another mass, which as considered, is related rather to the gravitation of bodies to each other, than to the movement, its was named "heavy" though it also was denoted by the same letter  $m$ . And by the reason that this property (inertia) seems as unexisting when anyone only observes the body, but does not act on it, but when one tries to accelerate the body, something prevents and reacts..., her was given a name "seeming". Force of gravity also invisibly presents when it has an equivalent counteraction (support) and appears really when this support is removed and the gravitating body is in motion with acceleration  $g$ .

Who, however, think about why inertia manifests itself only when one try to budge the body or to lift it, ie in the presence of any acceleration of its movement (translational or rotational), and affects on the effort, which we must apply to the body in order to change its position or condition in space and time. The proportionality factor between the force applied to the body and between the acceleration of the body is designated as a mass  $m$  in the expression:  $F=ma$ . The same characteristics

of the body had been presented in the analytical expression for the centripetal and centrifugal force:  $F_{c.p.} = -F_{c.f.} = mv^2/R$ , and for the potential energy:  $U = mgh$ , and for kinetic energy:  $T = mv^2/2$ , and also in the equations for ideal and real gases, etc.

*The notion of mass in science is ambiguous. In addition to the heavy and inertial mass there are also used the concept of mass of rest and the relativistic mass. And when you take into account both the magnitude of the forces acting on the body and its relative direction, it is also proposed to consider conception of longitudinal and transverse mass, and, as is suggested quit recently, also consider negative and imaginary mass!?*

One thing is clear, the parameter (property, measure) of mass which is denoted in formulas by the letter  $m$ , characterizes an invisible universal physical characteristic of our material world, which manifests itself at different levels of its organization. And, as I believe the deep essence of properties of mass consists just in the ability to feel a connection with the rest of the world. And this connection is shown and responds to any change of the status quo. Another question is whether the formulas invented by people characterize this connectedness. Objectively, the indicator of this connectedness actually is the resistance to an accelerated motion (and in the sense of inertia, and in the sense of gravity). So this connectedness displays itself at all levels of matter organization, we just call it in differently.

Inertia in our world reveals in everything. For example:

*In mechanics:*

- *Upon closer examination, Newton's three laws are about the inertia:*

*Newton's first law states that if an external force does not act on the body, the body maintains a state of rest or uniform, rectilinear motion (inertia).*

*The second law states that the force of inertia appears in a body whenever we try to change (speed up) state (position) of body.*

*$F = ma$  - the external force, which acts on the body, causes the acceleration to the body.*

*$P = mg$  - the gravitational force of attraction (gravity), reports the acceleration to the body;*

*The third law states that for every action there is an equal and opposite counteraction (force of inertia).*

- *Centrifugal force, Coriolis force are also inertia. Overload on the centrifuge, the artificial weightlessness on simulators is achieved by the only way - by acceleration.*

- *Unknown hitherto the natural mechanism of the limitation of the speed for all material bodies in our world (the threshold of "C"), I believe, should include a mechanism for inertia.*

- *And finally, can anybody observe the state of rest in our dynamic world?*

- *By virtue of integrity (holism) of our world the accelerated recession of galaxies (whatever the reason) should influence all ecumenical events, ranging from the motion of the nuclei (of the spins), of molecules, tornadoes and up to the star systems and galaxies ...*

*In electromagnetism:*

- *EMF of self-induction and mutual induction.*

- *The phenomenon of magnetism is a manifestation of inertia of charges motion in the medium and nothing more...*

- *«Bremsstrahlung». As is known, electrically charged particles moving with acceleration or time-varying electric currents are the source of e.m.waves. It seems that there is an exception and this is the Cherenkov radiation - the phenomenon of electromagnetic waves, generation by the charged particles moving in a substance uniformly with velocity  $V$ , which, however, exceeds the speed of light  $C/n$  in this substance, where  $n$  - refractive index in this substance. But even here we see how the braking of charged particles in the substance displays the inertia of the particles, as a result the inertia of the particles gives a birth waves - the so-called "bremsstrahlung"! And in this issue should be an analogy with gravity charges and waves!?*

*All types of radiation (including gravitational waves, if they exist in nature?), can be safely attributed to the category of "«Bremsstrahlung", because they are all associated with acceleration, because if there is radiation, so it should be the reaction of the emitter, i.e. the response induced by the acceleration carries into itself the property of the inertial mass.*

*In optics:*

- *Dispersion, diffraction, Doppler effect, the redshift ...*

*In nuclear physics:*

- *The speed limit of particles, the antimatter!?* ...
- *And, perhaps most interesting: the letter  $m$  is the main figure in the most popular in the pseudo-scientific circles in the formula  $E = mc^2$ , and this, presumably, indicates on the inertia of all energy, ie inertia, which accompanies the process of materialization, structuring and ordering of World. In this sense, the value of  $C^2$  in the expression  $C^2 = E/m$  is a generalized measure of inertness and the most important characteristic of our world as a whole, because it sets on the certain level to the ratio of energy and mass. And, curiously, if we assume that in the process of the evolution the magnitude of "C" is changing, it could mean that is changed and the ratio of the chaotic free unbound unlimited energy ... and the orderly structured reasonable energy (ie of mass). When  $C^2 = 1$  energy equals mass!?*
- *And finally, we can talk about a certain inertia in the spiritual realm - mental and social manifestations ...*

### **3. Mass is the effect of acceleration: no acceleration means no effect.**

Under any look on the act of creation, whether it is the Will of the Creator (Higher Mind, Nature), or the will of case ... (as you wish!), we should recognize that the world is inevitably evolving thus that one thing must follow another, one follows from the other. The world is having character of the unity, integrity, connectedness, interdependence (holism), i.e. state where nothing can be limited, modified, without disturbing the rest. Well, and if you look closely, you will see and "track" along which the evolution is moved,- I mean the three Great Divine Principles: causality, temporality, and rationality. The Universe holds itself on these. Everywhere we find evidence of this. In this context, and we should consider all that we have: not as a given, but as a consequence having the reason, not as statics (or kinetics), but as dynamics, not as a whole, but as a part of the whole, and so everywhere in the variety and diversity at all times. The latter is directly related to such fundamental and universal concepts like mass, inertia, gravity, time ... and ... life.

So what is the nature of gravity, inertia and mass? Based on the analysis of the known facts, I came to the following startling conclusion: 1) **inertia, gravity and, consequently, mass have one and the same cause;**

2) **Property of the inertia, gravity and mass of bodies in all corners of the universe is not as a given, but as a phenomenon induced by the accelerated motion.** If there is acceleration of the motion then there is mass (gravity, inertia), if there is no accelerated motion then there is mass (gravity, inertia).

It is difficult to accept. But here's the curious thing, there is nothing to prove, in general, the answer is there. A lot of theoretical and experimental effort has been spent to prove the so-called equivalence principle, the essence of which, as you know, consists in the fact that the action of the heavy mass (weight of body) can not be distinguished from the effect of inertia (under acceleration).

*With the help of precise experiments of Eotvos and others it was shown that the gravitational mass of a body is exactly equal to its inertial mass. And, in my opinion, this is not surprising, because in these experiments neither the inertial nor the gravitation masses were measured. Experimental efforts were only focused on the measurement of the gravitational acceleration of various bodies. And we must admit that they managed to do this with very high accuracy.*

But what in here in this delicate matter causes rejection and directs to the thoughts that is the fact that there are two reasons for the only consequence and, mind you, in the most fundamental issues of world order. Whether the Nature with its rationality in all relations could afford this luxury?

Einstein wrote about it in 1946: **"Mass" is defined as the resistance of the body acceleration (inertial mass). It is also measured as body weight (heavy mass). The fact that two such different definitions lead to the same value for the mass of the body is astounding.**

Add to this the following: how to explain the origin of the "an intrinsic property" of physical bodies - the gravity. The scientists can not agree about this so far. If we assume that the bodies have the immanent property of mass then it is needs to attract of the concept of mass. If we speak only about the motion and reactions to it, it is enough to have the concept of energy. (Here the origin of the talks about the equivalence of energy and mass lays). The fact is that today the source of the gravitational force is not set, but the acceleration effect is marked everywhere.

But what does this mean in reality?

In the Universe where everything is in the accelerated motion (the fact of the accelerated recession of galaxies is marked by the Nobel Prize in 2011), the all material bodies will attend forces induced by the motion, which by virtue of the principle of equivalence we should summarize (plus or minus) to others which, as is commonly believed, there are "immanent" in the bodies. And it means that we really have to deal with the sum of two causes giving birth to one and same consequence.

Nature is simple and rational, and this can not be ignored. It could not admit the existence of two reasons for one and same phenomenon, albeit the most that neither is "equivalent". Please note, the question about the cause of the gravity does not appear in the first case and still remains unanswered in the second case. And this can only mean that our "weight" always and everywhere is connected with the movement (are you remember how is created a simulated weightlessness in a plane or on spacecraft orbiting the Earth?), and its value you can adjust by movement similar to centrifuge. (And, maybe, you know other ways to control the force of gravity?) And so it would be correct to assert gravity on Earth and throughout the universe owes its manifestation exclusively to a global movement. Note, not just motion, but it is accelerated motion (!)

Moreover, as I believe, the **fact of speeded up recession of galaxies, which astronomers observe provides phenomenon of mass (inertia, gravity) in our world - keeps in suspense the whole universe.**

And if gravity is a manifestation of the accelerated motion of bodies, presumably, when the acceleration will disappear, then the gravity will disappear too; and if the accelerated recession of galaxies will be stoped, the world will be without gravity (inertia) and what will happen with it we can only guess: it break up into elementary particles and photons or will begin to move in the opposite direction after reversing the sign of gravity on the opposite, or something else? But this already is from the area of assumptions.

So the accelerated movement of material entities in the different forms of motion (the spins of elementary particles, atoms... to stellar and galactic vortices...) and, primarily, **the accelerated recession of galaxies is a source of universal connectedness of our world, gravity and the any inertness... The property of mass, inertia and gravity should be considered only as a response (induction) of physical bodies to the action of external forces, and vice versa, the manifestation of the properties of inertia and gravitation in the bodies indicates the presence of external forces and on the accelerated motion of the system.**

#### **4. Fabrications of the equivalence principles are not necessary.**

Consider, for example, two usual for us but seeming different types of mechanical movements: a movement caused by the action of force applied to the body, and also the movement caused by the action of gravity. According to Newton's second law, both acting force and the effect of gravity cause the accelerated movement of the body.

So, we have two reasons for the acceleration:

1. The train accelerates. **Passenger feels acceleration since the acceleration presses it against the seat back.**
2. The man is falling from a height to the earth also with acceleration, but do not feeling **acceleration**, because he is in free movement, i.e. in a state of weightlessness.

What's the difference?

In our bodies there is no the special feeling of heaviness ie sensation which is associated with the acceleration of the movement in a train, in an elevator, in a centrifuge. We are feeling the power, or rather, the reaction to the force that causes the acceleration of the body.

In the first case a passenger have the contact with the external force, and there is the body's reaction to the action of this force, in the second – there is no such contact and there is no reaction. In the first case, an external force is acting and as a consequence of the passenger's body acquires an acceleration and kinetic energy; in the second case, the body uses its "internal" potential energy and as a result acquires kinetic energy and acceleration. In both cases body acquires acceleration and kinetic energy. In the first case, the energy is consumed from the locomotive, while in the second case is consumed the potential energy of the body conditioned by the position of the body relative to the center of the Earth. **Any mechanical motion is accompanied by the transformation of energy.**

In the first case, the acceleration mechanism is clear in general. The external force overcomes the inertia of the body, a measure of which is mass, and imparts to the body a certain quantity of kinetic energy  $T = mv^2/2$ . With the acquired extra energy the body can continue to move uniformly and rectilinearly forever in the absence of friction forces and any resistance to the movement.

In the latter case, the obvious external force is absent. Source of strength, as is commonly believed, is the strength of gravitational field of the Earth. In this field there is a difference in how the body moves: along the tangent to the Earth, or along radius from the center. Accelerated fall of bodies is conditioned of the radial force of gravity. (In deep space the noticeable difference for this is absent). Where did it come from? Every body which is located at a certain distance from the Earth has potential energy. Whole reason is in this. But the energy itself is from where? When lifting the body on height  $h$  above the Earth, the potential energy  $U = mgh$  is induced in it. The potential energy later tends to equalize the situation and returns the body to its original state of equilibrium. But this is a dynamic equilibrium.

So-called "**weak equivalence principle**", formulated by Galileo, consists in follow: all bodies, regardless of mass, are falling at the Earth (from the same height) with the same acceleration. Galileo gave the explanation for this phenomenon: "**If the body weight is strictly proportional to its mass  $P/m=g$ , then the acceleration of free fall should remain constant.**" I see and another explanation. **Different bodies fall to the earth with the same acceleration of free fall by virtue of law of conservation of energy.**

$$U_1 = m_1gh, \quad U_2 = m_2gh, \quad U_1/m_1 = U_2/m_2 = gh, \quad m_1/m_2 = U_1/U_2.$$

And it means that **the ratio of the potential energy of the body to the mass for the different bodies falling from the same height, is constant.** From this we can make the very intriguing conclusion that **all material bodies here do not differ by mass, but by their ability to stock up energy.**

"**The strong equivalence principle**" is the physical basis of the general theory of relativity. "**According to my understanding, my theory rests solely on this principle,** - so Einstein said about it. - **In what follows we assume the complete physical equivalence of a gravitational field and a corresponding acceleration of the reference system.** "

Let us consider this case by an example of a moving train. The different bodies in the moving coach are in the same conditions in terms of speed and acceleration. Change in the speed of movement is associated with overcoming the inertia forces. Under action the external force (of locomotive) the train is accelerated. Force acting on the body through the acceleration reports it extra kinetic energy, the coefficient of proportionality in this case is a measure of the inertia of bodies, ie the mass. The property of mass arises only during acceleration. Curiously, **the ratio of forces acting on the bodies during acceleration, is equal to the ratio of their masses, and also is equal to the ratio of their kinetic energies acquired by the bodies in this process. Proportionality  $F_1/F_2 = m_1/m_2 = T_1/T_2$  is executed for all bodies moving with equal speed (acceleration).**

$$T_1 = m_1v_1/2, \quad T_2 = m_2v_2/2, \quad m_1/m_2 = T_1/T_2, \quad \text{npu } V_1 = V_2, \\ F_1 = m_1 a_1, \quad F_2 = m_2 a_2, \quad m_1/m_2 = F_1/F_2, \quad \text{npu } a_1 = a_2.$$

Obviously the masses of different bodies and the forces acting on them, and their kinetic energies change synchronously with the change of their velocity, i.e. with the acceleration. No other (physical, chemical, biological ...) properties of bodies have any effect on these factors.

With the acquisition of a certain portion of the kinetic energy the body goes with the one speed uniform and rectilinear motion to a different speed of the uniform and rectilinear motion of the body. The "quantum mechanicians" would say that the body is moved from one energy level to another.

Einstein said: "... *Had one tried to explain to Newton the equality of inertial and gravitational mass from the equivalence principle, he would necessarily have had to reply with the following objection: it is indeed true that relative to an accelerated co-ordinate system bodies experience the same accelerations as they do relative to a gravitating celestial body close to its surface. But where are, in the former case, the masses that produce the accelerations? It is clear that the theory of relativity presupposes the independence of the field concept.*" [3].

**On this question, we can now answer so: there is the acceleration, which holds in the tension the entire universe, and there is the consequence (effect) of it - property of the gravity induced in the bodies.**

Noteworthy is the situation with the rotational movement. (Einstein, as you will recall, in the STR bypassed this topic by attention.) First, the rotational motion, in contrast to the progressive, does not meet the requirement of inertiality which was formulated by Galileo and Newton. This has a direct bearing on this question. The centrifugal force gives birth to the inertia of the rotating circumferentially body. (The force has tending to direct a motion of the body at a tangent to the circle, and this is compensated by the centripetal force which directed toward the center of the circle (or the axis of rotation) and thus creates a normal (centripetal) acceleration). This is true for both uniform and accelerated motion along the circumference.

*If the body rotating at circumferentially (e.g, a hammer in the hands of the athlete-thrower) it constantly is striving to go at a tangent (under the influence of centrifugal force  $F_{c.f.}$ ), but under the influence of other force, so-called centripetal force  $F_{c.p.}$ , directed in the opposite direction to the center of rotation in consequence of the rigid connection of the body (hammer) with the center (axis) of rotation, constantly is forced to change its direction of movement and move circumferentially. They say that the body gets the normal (radial) acceleration, where  $F_{c.f} = - F_{c.p} = Mv^2 / r = m\omega^2 r$ .*

*On the freely suspended and gyrating body (the case of non-rigid suspension of body - a carousel) are acting simultaneously two forces seeking to change state of motion: force of the earth gravity  $P=mg$ , and the centrifugal force of inertia  $F_{c.f} = Mv^2/R$ , which determine the trajectory of motion. The resultant force can be evaluated as a first approximation by the formula*

$$F = m (v^2 + g^2 R^2)^{1/2} ,$$

*and the induced mass*

$$m = F / (v^2 + g^2 R^2)^{1/2} .$$

*The resultant force, notice, is the sum of the "heavy" and "inert" masses and it is not a problem, because the nature of these masses is the one - a measure of connectedness.*

*In the case of rigid centrifuge the force of gravity of the Earth is acting on the body, compensated by the force of reaction of support; the centrifugal inertia force acts on the body on the centrifuge as alone, in accordance with the formula  $F_{c.f} = Mv^2/R$ .*

As you can see, there is no difference (of antagonism) in action between the so-called inertia, and the so-called heavy mass.

Secondly, unlike the case of translational movement of the body, the property of gravity (inertia, mass) of the rotating body can be caused (be generated, be induced) not only in consequence of the linear acceleration:  $d^2S/dt^2$ , but also in consequence of the radial acceleration:  $\alpha_r = v^2/R$  even in the case of a constant linear velocity. Therefore, we say that **in the case of any curvilinear motion the property of mass (inertia) occurs in response to any motion, or even accelerated.**

We must bear in mind the following. The every local event around us and with our participation, which we register from our point of view or else in the reference frame associated with the observer,

and our judgments about it there will always be subjective. We can not to go away from the fact that we, together with the Earth are in constant motion around axis of the Earth with linear velocity (at the equator) 465 m/s, and at the same time around the Sun with a speed of 30 km/s. Besides together with Solar system we are in the constant motion with speed of 200 km/s around the center of the Milky Way galaxy, and along with the Milky Way galaxy we are moving through space with the speed of 263 km/s. Your head does not began to whirl? Now add to this the recession of galaxies with acceleration ...

*In space, all objects move across the Rounding trajectories (though not always close-mouthed). Is not known no one cosmic body, which was not subjected to the rotation. Rotation is the inherent property of any medium, where one particle affects on the movement of others. In our universe, practically, there is no of the rectilinear motion and there are not of the rectilinear trajectories.*

*The same can be said about the state of rest. There is no state of rest in this world. This word should throw out from the vocabulary of physics, leaving it only for the case of descriptions of a rest on a bed beside the fireplace.*

Thus, **any external force creates an acceleration in the body, which with coefficient of proportionality (transformation), equal to m, depending on the "viscosity" (a connectedness) of environment (inertia and gravity), is converted (transformed) into kinetic energy, which is stored in the body during the subsequent uniform and rectilinear motion, or as potential energy in a state of "relative rest."** (The "relative rest" if to permit such a definition in physics we may to consider only conditionally only for the case of balance of power, and as everything in this world, only as local and relative.)

Thus, **the mass parameter which is used in the formulas of classical mechanics, is nothing like the proportionality factor that sets a definite correlation between the acceleration and power (energy) of the body in the course of their mutual conversion (transformation), taking into account the communications of the body in the system of bodies (a kind of connectedness - inertia, gravity, energy of communication ...)**

Classical (relativistic) physics describes the state of the body as a 4-energy-momentum vector:  $E^2 - \mathbf{p}^2 c^2 = m^2 c^4$ . (This equation was obtained by solving the two original equations:  $E = mc^2$  and  $\mathbf{p} = m\mathbf{v}$  in the relativistic version). I draw your attention to the kinematic nature of this expression. There are no the reasons, namely, power and acceleration necessary to analyze the dynamics of the process.

Quantum mechanics, as known, refused from such detailing and rational manner proceeded to consider only "quantum states." Any physical body in this world has a certain quantum state, which is characterized by the level of energy and by time of life of this level. The concept of "state" is not directly related with the usual classical system characteristics (mass, velocity, temperature, etc.). These values are secondary here, to represent the nonlocal quantum states they are simply inapplicable. In this respect, the energy is a universal value, and it can be used in all cases.

Any object in our world, as it follows from the theory of relativity, has energy, simply because it exists:  $E = mc^2$ . Initial principle structuring in the nature is the quantization throughout the levels of energy. Nature is reserving to select the discontinuous series of states. They are something that we call the energy levels. Any changes in the state of the system, including our thoughts, feelings, desires, etc., from the point of view of quantum theory, are tied with the changes of its energy, and they are functions of state of the system.

Acceleration of the body, in this sense, is tied with the movement of energy, or, in other words, with work on the transfer of the body with one energy level to an other, i.e. to the larger (or smaller) order. Any ordered motion, including the uniform rectilinear motion of the body at a certain speed (as we say, coasting), was paid by the energy dissipated into the environment (as required by the 2nd law of thermodynamics). This means that order in this world, including life itself, is paid by the energy dissipated into the environment.

We assume, as is customary in quantum mechanics that **the energy of a system which is in the state of the motion outside the state of the equilibrium, i.e. is limited, structured and organized in as dynamic patterns in space and time..., has a new higher quality. On the contrary, the movement of the system towards a simplification, uniformity and homogeneity, which is indicated by an increase in entropy, reduces the quality of energy. The property of mass thus**

**reflects the change in the power quality in due to change of the space-time ordering of system and its structure, proportional to degree of its deviation from complete homogeneity.**

So, the uniform rectilinear motion of a body which has been formed under the influence of external force meets to the certain level of energy in the system of bodies of the universe or other words to the certain degree of order (in the system of chaos), that in itself provides (in the absence of outside resistance) infinite movement in a predetermined direction without consumption of external energy. The fact is that order with respect to the chaos represents organized force, and it provides Mind! (Although, as was shown by Prigogine, in nature occurs and self-organization – “synergy”.) In this sense the kinetic energy which is accumulated (stored) in the body during acceleration (or a momentum of the body) is identified with a measure of the order, ie the with the value which is related (proportional) with entropy. This is probably meant E. Verlinde, formulating his "entropic" theory of gravitation.

*The fact that the passenger in the car in the time of uniform and rectilinear motion does not feel energy, which was induced in it in the result of the train acceleration tells us possibly that the process affects more deep levels of organization of matter, and it possibly has the relation to the spin dynamics of atomic and molecular conglomerates (structures) of elements of the microcosm. There we should look for going out to a reason of the world connectedness and the dynamics and also on the accelerative divergence of Galaxies and holism of the world. Also perhaps this process can go by the "entropy" way through the order-disorder. The curious statement to this effect remained of Lao Tzu: "Unfathomable Dae - this is what fills the shape of things, but it originates from Tao. Tao is what drives things to move, its way is mysterious and unknowable. "Continuing this thought, Chinese philosopher Huai Nan Tzu said: "The one who follows to the natural order, is involved in the flow of the Tao."*

Thus may be is not the energy (kinetic) which has been pumped into the body during acceleration namely, regime of the ordering, which was created by the rational way before this and which can be characterized as the difference between the entropy of the body and environment, supports the uniform rectilinear motion of the body ? (And, incidentally, explains it).

## **5. Our world has arranged so.**

*"The motion there is no, said bearded sage.  
Another sage said nothing and stood before him walk.  
He could not object stronger;  
The all were praising the convoluted answer.  
But, gentlemen, this fun case  
Leads me to another example:  
Though every day the Sun goes before us,  
But stubborn Galileo however is rights "*

*/ A.S. Pushkin, 1825. /.*

**World is connected into a united whole by the movement! Namely, the accelerated ecumenical movement creates the effect of a general inertia, gravity, mass, and thus unites, links, organizes, directs ... evolution.** One movement breeds another, one event (state) follows from another - everything is interconnected, exactly, quantitatively and qualitatively, in a single flow-vortex of colossal energy, in line with the three great principles of God's Creation, there are: **causality, temporality and the reasonableness.** **The energy of that connectedness in one form or another, to one degree or another is present into all phenomena and events at all levels of the organization of the world order.** In the place where, for whatever reason is torn one connection are discovering the others connections of more high (low) level and so on without end ...

**"The correlations between objects are not the only interesting aspect of quantum theory, but are the most important"** - as was expressed in his time **Erwin Schrödinger.**

Uncertainty in the minds of thinkers occurs every time you try to fragment our holistic world, divide the indivisible, by defining and limiting, forgetting about that the every boundary in this world is only a convention. Divide something in this world in the truest sense of the word is not possible in

principle. It understood many prominent thinkers. However, with great zeal, scientists continue to issue "on the mountain" all new particles, fragments, giving them into property not only "mass", but also a host of other more poetic characteristics. Moreover, some of these virtual particles (fragments) have been appointed by as "responsible" for some physical interactions, including for the gravitation (bosons of Higgs). Although sometimes namely into their force (of energy of connection), of connectedness or the ability to resist to division follows to seek the qualities that attribute to the fragments as separately. These are: mass and the charge, the coordinates... and impulses...!?

Attempts to describe the real state of the individual macrosystem on the basis of Schrödinger equation were made earlier repeatedly, including and by Schroedinger. His idea looks as quite radical and is as follows. **The wave function  $\psi$  itself is reality and needs no interpretation Bourne. The atomistic structures, about which  $\psi$ -field should was something to speak so far, do not exist at all, at least as the localized objects. Conformably to our macrosystem, this means that a macroscopic body, as such, does not exist at all, in any case does not exist, at least approximately, such things as the position of its center of gravity at a given time [4].**

The main point of the world process (and at the same time of the physics as a science that seeks to understand this essence) is the continuous movement of energy in the universe from the one level of the organization on the another, from one form - in another; at first out of some natural (uncombined) state to the more ordered in space and time state, and then back again, either spontaneously or under the influence of reasonable force.

Speed indicates the kinetics of this event, the kinetics is answering on the question "how" and this can not influence on the property of mass. Acceleration refers to the dynamics and is associated with the cause, answers the question "why" since it is tied with the action of forces and the transformation of energy.

Only the energy has the physical essence in our world. Everything else represent by itself different abstractions, conventions, metaphors, endowed with certain characteristics and qualities, and composed, logically, in certain quantitative and qualitative relationships with each other (this includes concepts such as gravity, inertia, mass, charge, etc.) but are devoid of any physical essence and represent a causal and temporary energy events, consisting each other in certain relations. (All fundamental physical theories were built on the differential equations, where time is by the finite "argument").

All events are a consequence of the movement of energy in time. **Time is the main factor of evolution of the World.**

From the standpoint of evolution, the freely (chaotic) motion of energy doesn't have creativity. The uniform and rectilinear motion also is conservative and also does not change anything and does not create but only keeps the level of achieved earlier order. (This is only one form of conservation of energy). **And only acceleration is the factor that changes, creates ... Time is standing behind this factor!**

The difference in the action, that hidden behind the operators of  $dS/dt$  and  $d^2S/dt^2$  in our world is enormous. Who thought about it? It looks that our world totally is not against of that moves uniformly in a straight line, smoothly and consistently, supports and maintains this state. In this state nature requires neither work, nor energy. Another thing is the acceleration and deceleration. Any change of velocity or acceleration (whether linear or normal), encounters resistance (even in space) and requires expenses of the energy or performance of the work. And this means that only acceleration is driving the evolution in our world.

**The whole universe is in the accelerate mode of the movement.** This fact suggests that there should be a reason for that - powerful acceleration force. Modern science can nothing definitely say what is the nature it, or else as just add a new  $\lambda$ -member or remove old in the known equation (it is joke). The best thing that came up is that the recession of galaxies is due to the influence of a mysterious dark energy. Although, in my opinion, there are and more "grounded" assumptions. Allow me to express them.

*First.* The universe is still in a state of relaxation, i.e. comes to equilibrium after some that took place earlier, universal fluctuations. From here it is possible to make such a conclusion: **biblical act of creation is not finished!?**

*Second.* Our Universe is subjected to the action of some external force. Source of force causing accelerated motion (expansion) of galaxies of our universe is logical to look for in its interaction with the others adjacent universes, hitherto unknown to us, but having the opposite

sign of properties or gradient of physical parameters, and relating to the multiverse, or even into other dimensions!?

*Third.* (This option is for the reader, perhaps the most unexpected). The logic of physics, based on the rigor of mathematics, suggests that only the time can have such force, power and authority in our world.

**Management of the time is theoretically the most simple, fast, effective and creative way to run the world on the path from a "Word", which was "in the beginning" ... to the real world and further into the future, across evolution, gravity, inertia..., and at the same time rule the "space-time continuum", as it follows from the surprisingly simple, but downright divine relation:  $a = d^2S/dt^2$ .**

The very fact of the accelerated recession of galaxies, taking into account the ideas presented in this essay, tells us about it.

The World acceleration affects on all processes in world, are closely related to the evolution of animate and inanimate matter and with the cosmos as a whole, and we are the part of it. And about that, **along with the acceleration of the movement of galaxies, all their constituents inevitably must to get property of gravity, inertia and mass ... exactly the same as the passenger train (lift centrifuge...) feels a rush of gravity in response to the acceleration of the train (lift, centrifuges...).**

Accelerated motion of galaxies implies not only the external force, but also presence of mechanism of connectedness of elements of the galaxy, and of the galaxies themselves, arising in response to acceleration. We are a "cosmic dust." Forces of the cosmos and the "the earth steps" are incommensurable quantities. All the power in the cosmos and from space. Gravity, inertia and mass, corresponding to them, are the embodiment (properties and facilities) of the energy of cosmic connection.

*Quantum mechanics "canonically" has linked the energy and time using relation of uncertainty of Heisenberg:  $\Delta E \cdot \Delta t \geq h/2\pi$ .*

*The main epistemological conclusion of Noether theory consist in that the laws of conservation of energy, momentum and angular momentum are inextricably linked to fundamental properties of the surrounding space and time and ultimately depend on the cosmology of our world.*

*Hence the converse is also true: the accelerating or the decelerating the speed of rotation of the heavenly bodies, the violation of the energy balance of reactions, etc. is a consequence of violations of space-time symmetry.*

The effect of accelerated expansion of Universe is able to gather in certain areas of the Cosmos the huge masses of space fragments, forming stars, planets, comets, galaxies..., thereby aligning, balancing the gravitational and inertial situation and thereby transferring the idea of the source of gravitational (inertial) properties of the space on the cosmic formations. We believe mistakenly that the force of gravity is peculiar to the bodies (or to their masses) because the bulk of the substance (in terms of quantity) have been gathered at these points in the foreseeable limits of the Cosmos. And all of this is in a state of dynamic equilibrium.

*Where cosmological theorists can perceive the presence of a black hole, there can be quite ordinary space objects in motion. Under the acting of the laws of cosmos the accelerated motion of celestial bodies forms "swirls", which able to involve into them everything that is near. (You can see, if desired, "next of kin" of black holes on the rapid rivulet in unlimited quantities). Need to proceed from the fact that gravity is not a given. Source of gravitation is not the substance itself or Newton's "gravitational field". A property of gravity (inertia) is induced in the bodies as a result of accelerated motion of bodies providing connectedness and "holism" of the world. Gravity of this kind can not create objects with density more than some limiting value, not to mention the black holes. In accordance with the tenets of relativism, acceleration of any object represents the growth of their energy and inertia.*

How the inertia is associated with the acceleration Chandrasekhar has pointed in 1936, studying processes in stars. **"If the electron's motion is slow, then, as in everyday life, an increase of energy**

*means more rapid motion, that is, higher speed. If the electron is already moving at close to light speed, however, there is no way its speed can go up much (if it did, it would exceed the speed limit!), so the energy increase takes a different form, one unfamiliar in everyday life: The additional energy goes into inertia; that is, it increases the electron's resistance to being speeded up" (emphasis mine - EF) [5].* I think this is not quite true. The obstacle to accelerate is the universal connectedness of world at all levels of organization of matter. And so is the case everywhere where speech goes about inertia.

There are theories which suggest that the source of the gravitational field can be waves that occur in five-dimensional space with respect to which our world is accelerating (or is slowing). In this sense **the force of gravity can be viewed as the acceleration vector in the force potential field which is external towards our world.**

The presence of the speed limit for all motion (and of light including) in our world directly and unambiguously evidences that the universal movement of the world as whole is primary, and everything else is secondary and has been induced in the process of movement, including inertia, gravity, masses, and all the kinds of interactions ...

Finally, there is another interesting idea. Conception of mass (gravity, inertia) as a measure of the connectedness of the world does not exclude (and quite admits) significant fluctuations of gravitational forces in the world in historical terms, directly related to changes in the dynamics of the Cosmos (acceleration, centrifugal forces...) that can clarify (logically explain) the situation with the presence in the ancient world of dinosaurs and giant megalithic constructions.

*Fantast, which ponders about the artificial antigravity, should bear in mind that the property of mass by its very nature there is the body's reaction to the acceleration, hence, we can affect on the force of gravity only by means of the more strong acceleration. As they say, "like cures." Nothing else we know.*

Additional information can be gleaned from [6-9].

## **6. Absolute inertial frame of reference is the World time.**

For the phenomenon of mass endowed with such universal properties as inertia and gravitation as it seems to me, in our world is assigned **the role of the creative mechanism of Creation**, something like the control lever in the hands of the Creator for the binding of elements and for regulating the development of the world process and its branches (of evolution) in all their variety and diversity. After all, if you stick to the Biblical view on the process of the creation of the world and to assume that the world is moving on the path from "The word" ... (Thought of the Creator, unrestricted in time and space) which was "at the beginning of ", to the realities of the present and future, - as we mentioned earlier - the process just needs a "brake" that should slow movement.

**Albert Einstein:** *"... my career have identified various forces over which I have no power, primarily those mysterious glands in which nature prepares the very essence of life. Henry Ford may call it as your inner voice, Socrates defined it as a daemon: each person in one's own way explains the fact that the human will is not free ... Everything is determined ... by forces over which we have no control ..., equally for an insect and for a star. Human beings, vegetables or cosmic dust - all we are dancing under the mysterious time which is modulated somewhere by the invisible performer (emphasis mine - EF)."*

Everything that said in his time this man of genius deserves close attention. All subsequent events proved it. This quotation is something special, and it definitely does not give me rest.

If you noticed, everything about what we have spoken here: movement, speed, acceleration, and finally, about the life and evolution... anyway are locked on time. There is no higher secret for a man than time. The time is always and is in all simultaneously But we can neither see nor feel it, and we can not to measure it. We can not affect it, although are a lot of talks about it. And is absolutely not clear **in respect to the what (?) we should measure the time** and all that has been subjected to the time?

Einstein found a solution: took as a reference (something like an anchor) the limit of the speed of light "C" and has built theory of relativity. Construction of this "castle in the air" has demanded from Einstein and his followers a lot of effort, such as the fitting of all the classical theories under this lath

and also of the great sacrifice: it was necessary to make a space and time as "rubber". Nowadays, the apologists of these "paradoxes", desiring to preserve innocence of his creation, are trying to explain irrefutable facts which operate against the theory, for example, the superluminal events (tachyons, pulsars...), go even further: they are ready to admit into the theory the imaginary (and negative) mass and the negative energy...

Many things indicate the active role of time in nature. ***"If we want to build a unified, consistent physical theory, - says in his recent monograph the known contemporary Canadian physicist Lee Smolin, - we must first solve the problem of time"*** [10].

**So what is the time?** This is the "something" or a "nothing"; entity or relation, the excess or lack of of fantasies? Do not judge strictly. This dispute stretches, as are known, from ancient Greece, somewhere from Parmenides and Heraclides, and as you can see, is no end it..

When it comes to the mystery of time, I am recalling a situation that happens to us whenever we travel by train. As mystical (mysterious) for me here is that passengers in cars with curtained windows do not feel any movement at all: they sit on the bench as a matter-of-factly, they are drinking tea, are flirting, or are walking along the car and the any side sensations at them do not arise. But when the train slows down its movement, or deviates from the straight path, all the train passengers immediately feel it. Isn't it a miracle?

On the question, relatively to what this car moves uniformly and rectilinearly, and relatively to what it is accelerating, Newton, as you will recall, has answered: with respect to the absolute space. It's simple. But to understand the depth of the problem, I'll tell you what Newton thought: all his achievements in physics are basis for support of this truly important discovery, absolute space. He wrote: ***"The recognition of the true motions of individual bodies and their exact delineation from seeming is very difficult, because the parts of the fixed space, about which has spoken earlier, and into which are performed the true motions of bodies, are not perceived by our feelings."*** In the end, if the absolute space does exist, it must to give a reference point for the recognition of any movement, but not only for the speeded up movement.

Unlike abstract Newtonian reference system (absolute space), Mach has offered the system of reference which can see everybody - this substance which has distributed into the space.

Einstein, as you remember, was not satisfied by either of these reference systems. At first, in the special theory of relativity even more abstract absolute space-time has appeared, and then in the general theory of relativity - the gravitational field.

*It is quite obvious that Einstein's general relativity is in contradiction with the conclusions of Emmy Noether's theorem. The theory is a model of the asymmetric world in which no conservation laws, the space is isotropic and homogeneous, time is patchy. How it is to be understood? To recognize that Einstein's general relativity theory can not be "by general theory" in the truest sense of the word, but only by "local", or we should to doubt the validity of the conservation laws? (But somehow about these nuances it is not accepted to speak).*

*.When John Wheeler humorously said that in general relativity "mass manages the space, telling him how to bend itself, and the space manages of the mass telling him how to move", he could not does not understand that the theory is incomplete, and should to define else the external force that controls the world.*

You have not forgotten that the talk about the absolute reference frames we have began in connection with the mystery of time? What a connexion could be here? Have you any associations in this regard? I'm having are. Here they are.

**"Temporality"** is one of the three Great principles of world order that are responsible for the evolution of. The whole Universe is subordinate to them. A pace of the progress of the world time is of decisive importance for the future of our world.

The carriage which moves uniformly and rectilinearly seems as an ideal inertial reference system (IFR) for its passengers. Exactly the whole world also has inertia in relation to the progress of the time. **World time is a unified absolute inertial reference system for our Universe** with all the ensuing consequences. **All of us are moving in the "car-time," ("uniformly and rectilinearly") and therefore, as in the car with the curtained windows, nobody can not see the time or even notice the time, the devices can not measure the course of time and we can not influence it.** The astonishing feature of this "car-time" is that its passengers, as seems to us, do not have any communication with the "outside world", i.e. there is nothing that would indicate a change in speed or

direction (acceleration) movement of the "car" itself. Inertia of phenomenon of time is absolute. Ocean of time embraces the whole world and dissolves it in itself. Time is the highest order. And only the living mind can disengage to form the temporal dynamic ordering, extract the time from this ocean, but need formerly to pay for it by a special kind energy.

And as in a conventional inertial car to make a step, you need to push off away the floor of the car, that requires contact with the floor, also in the "**car-time**" to get an acceleration (or slow down) with respect to time, you need to interact with the time. And it can be done in only one way, to expend work (energy) and in that way increase the ordering in the world in a reasonable manner. The easiest way is acceleration of the body in relation to the flow of natural processes. The other way is to raise the body temperature to accelerate the internal processes within it. Still better to keep the temperature of body at a higher level, as learned to make it living organisms. But for this you always have to do work, to constantly spend energy that is nothing else than "a contribution" of nature. "Car-time" has the relation to the evolution since it supports the movement to the order (a good example for this is the uniform and rectilinear mechanical motion that does not require energy). As any acceleration in the mechanical system the process of an acceleration (deceleration) of in the "car-time" is associated with the performance of a work on the creation of the additional order and is associated with the structural (or other) mutation of the body that demands compensation energy into the environment.

Acceleration relatively to the world time require of expense of energy, work. Our life including!? Living matter learned to do it automatically - continuously maintains the temperature of the thermostat by exchanging of energy of the special quality for the time of life, and so is living for some time in harmony with time, i.e, inertially.

Can not be in this world in the full sense of "clean" inertial local mechanical systems. **The only absolute universal frame of reference for our Universe, truly inertial, is the system which tied to the absolute world time.**

## 7. «Idee Higgs».



Nobel Prize in Physics for 2013 was awarded to the physicists Peter Higgs and Francois Englert "for the theoretical discovery of a mechanism that contributes to our understanding of the origin of mass of subatomic particles".

"**Higgs Ocean**" is intended to explain the origin of the mass. The acceptance of this theory means that property (quality) of mass since birth and forever is transmitted to the particles, bodies and organisms. And then, everything goes according to rut. The mass becomes a cause of such phenomena as inertia and gravity, and their equivalence is detected simultaneously with this. However actually it turns out wrong: mass, inertia and gravity as if exist but no the reasons for their being.

But and the explanation which was given by the Higgs theory seems to me unsatisfactory when say that the particles (and, consequently, the molecules, bodies, etc.) are taking on itself the mass as dirt out with the mythical "puddle" of Higgs!? Yes, and it is unclear for what there is this mass? What is the purpose of this action? From her only harm? In essence, the "legend" about Higgs particles adds us some beautiful metaphors, higher-level abstractions, but not a jot bring us closer to the truth. In short, it is "idee Higgs"! Lets try to understand. Higgs ocean looks like a conventional viscous medium. However, it is not. And for this there are a number of reasons.

- Higgs theory suggests that this particular ocean fills the entire space, so there is no way to remove particles from its influence. In a situation with a viscous fluid we can always pull out your hand and to feel how become easier to move her, but the Higgs theory does not allow

that. **Particles of one type are acquiring the appropriate masses, no matter where they are located in the ocean.**

- The usual viscous medium inhibits any movement, while the **Higgs field resists only to the accelerated motion**. Particle moving through space at a constant speed, in contrast to the hand movement in a viscous fluid will not experience "friction" in the ocean of the Higgs. Its motion will remain unchanged. Only **when we try to accelerate or slow down the particle, the Higgs field will show its presence as the power which we should to apply**.
- Ocean Higgs gives mass only for fundamental particles, such as electrons and quarks, but when particles are combined into the composites of these particles like protons, neutrons. atoms... then come into play others well-known sources of masses.

Protons and neutrons are composed of two types of quarks (a proton is consist of two u-quarks and one d-quark, a neutron consist of two d-quarks and one u-quark). Through years of research are discovered four species of quarks, whose masses span a wide range from 0.0047 to 189 proton masses. Diversity of masses is explained by the fact that different types of particles interact with the Higgs ocean with the different force. **If a particle interacts weakly with the ocean or does not react at all, then the resistance will be weak or absent, and the particle will have a small mass, or will not have mass at all.** Photon, for example, moves through the Higgs ocean without resistance and therefore does not have mass. Conversely, if the particle interacts strongly with the Higgs ocean, it will have a higher weight. The heaviest quark (called the t-quark) with a mass of about 350 000 electron masses interacts with the Higgs ocean in 350 000 times stronger than the electron and this is the reason of its large mass.

To date, there is no satisfactory explanation of how particles interact with the ocean, and why the known particles have precisely those masses which are detected experimentally. If the Higgs ocean was not, according to scientists, all fundamental particles would be similar to the photon and absolutely would not have mass. This case could to have a place unless only in moment of the early universe.

A legitimate question: is not whether the theory of Higgs as a next attempt to revive the idea of the ether? They say it is not, although certain similarities with the ether there are. The Higgs condensed field, like the ether, is the inherent quality of the empty space, it permeates all space, penetrates everywhere, present throughout. There are however significant differences and the main thing is that the Higgs ocean has no relation to the motion of light and does not affect its speed. Since the Higgs ocean does not affect on the fact that moves with constant velocity, the ocean is not associated with systems of reference, whereas this property was attributed to the airwaves. All observers which are moving with constant velocity, are in the equal position relatively to the ocean of Higgs, and in this sense, the **theory of Higgs does not contradict the special theory of relativity**.

### **My considerations.**

#### **Two "ocean" - compare!**

##### **I. Higgs ocean.**

1. Ocean fills all space, permeates everything and everyone in the universe. Of this ocean impossible to go ashore "by dry", ie remain without properties of mass (inertia). In the any place of the ocean the particles of the same type have the same masses. It should speak about the high homogeneity and isotropy properties of space and time and of the themselves laws of physics?
2. Ocean is one for all, however different particles have different masses; the ocean acts on quarks and electrons, but does not act on their conglomerates. What is this discrimination? They say that energy of communication is added (!?)

- Ocean interacts (or resists...) only with particles which move with acceleration and does not interact with the particles which move uniformly and rectilinearly. What is the mechanism of interaction? The point, probably, in dynamics?

Higgs theory does not give answers to the questions above.  
Now imagine another hypothetical ocean with another property.

**II. Ocean (flow) of the "time" is the absolute inertial frame of our world - the source of "temporality", one of the three sacred qualities of Universe, which constitute, in my understanding, the unity of the creative principle of the World (two other: the causality and cognition (rationality, consciousness, mind)).**

“Temporality” is responsible for the arrow of time from the past to the future, the movement to equilibrium, monotony, chaos, is reason of the permanent decline in the quality of energy and accelerated recession of galaxies. We are the temporary inhabitants of the universe and we move in this flow (as the passengers in a train), uniformly, isomorphically (regardless of the spatial direction) with some absolute speed, and we do not notice this absolute motion of "car-time", and we can not discover it "from our point of view" (as out of the car with curtained windows) by nothing.

### **Properties of the ocean of time.**

- Passive movement in the flow of time (this, by the way, the main feature of inanimate matter) does not require the cost of energy. Energy as a contribution of nature requires only for an acceleration or deceleration of movement with respect to speed of the universal flow of time (say, only under the violation of God's "timetable"). Any interference in the natural course of events meets resistance of nature, and it is what we call inertia or mass. Mass arises as the effect of acceleration-deceleration relative to the flow of time, in all other cases it is absent. The time flow is the phenomenon exclusively homogeneous and isotropic. *(This is the answer to the first question above.)*

- Property of mass (inertia) of the different particles is proportional to the energy expended, as is commonly believed, on the acceleration (deceleration), and in fact, to change their course of time in the stream. *(This is the answer to question 2.)*

- Ocean of time permeates everything, affects everything. When moving particles (bodies) in the flow of the time ("to march in step"), the essence of mass (inertia) is not displayed (not induced), the energy costs for this movement is not required. Inertia appears in response to the acceleration and is proportional to the acceleration (Newton's second law). Acceleration of particles (bodies, organisms ...) is proportional to the energy expended, for example: the  $E_C = m v^2/2$ ,  $E_p = mgh$ . *(This is the answer to the third question.)*

Inertia it is the same that the EMF of self-induction, ie the reaction of nature to the purposeful intervention into the world-wide order (spatial-temporal, or power) from the side of reasonable matter ...! It is energy process. Note that humanity has moved forward in his evolution and has began to progress in its development only after it as learned how to manage the random thermal motion of the gas molecules and transform it in the directional movement of the piston. From that time began a marked human impact on nature, unfortunately, with the completely unpredictable consequences. Because they began to destroy the natural order of nature and got to atoms and nuclei.

## **8. The time as a loan.**

### **Axiom of life:**

**All visible reality is only the fluctuations of energy flows in time with varying degrees of their organization, relatively of the single and indivisible stream which denoted in our mind as an arrow of time.**

## **The phenomenon of "life" is the continuous struggle for time!**

Life is not only an unusual phenomenon in all respects, but in a certain sense (in terms of the laws of thermodynamics) is unnatural phenomenon. But you can hardly guess that in order to live, we should uninterruptedly to borrow time as loan from the Universe!! We are changing energy on the time itself, and we are alive until we are spending the energy. Unlike inanimate matter, life requires the acceleration of all biochemical processes! Apparently this is a necessary condition on the way to the supreme organization of matter, whether plant or animal life. Increase in body temperature (for example, for the person it is those 36.6 °C) is associated with this. For plants this threshold is one, for microorganisms - another, for multicellular organisms - the third, etc. Life requires a constant flow of energy, primarily from the Sun. And in this sense, the efficiency for different organisms is different.

**And it turns out that any reasonable essence (and only!) in order to live organizes, transforms the energy in a qualitative sense, and most importantly, exchanges it on the time of own life! For the every moment of life we are paying energy, the energy of definite quality. How much "green"-joules you spent, so much minutes of life snatched from nature and no one minute more. In the role of the equivalent in such an exchange between the energy (power) and the acceleration (2-nd Newton's law), just and is in our imagination the measure of properties of mass, inertia or self-inductance. It is in connection with the time ought to look for the cause of mass. I would say more, but I'm afraid you are unlikely to agree with me: in the mass of the ordered matter is reflected the itself "frozen time" !?... (A simple analysis of well-known classical formulas indirectly indicates this).**

*It is possible that together with well-known and proven conservation laws, which act in the world, must act and the law of conservation of World Time!? If the time somehow is associated with the mass, then, for example, the events such as a nuclear explosion, accompanied the transformation of energy and mass, adds into the nature an additional amount of motion, and thereby returns time to the nature, as a driving force. (In this question we came near to ideas N.Kozyrev).*

*We have some experimental data, which, guided by the theory of relativity, can be explained reasonably only in the assumption that the local release of energy stored in a substance at a given level of its structural organization (for example, at the level of the chemical bonds, at the atomic, or nuclear level) exerts influence upon a curvature of space-time around the area of the energy release. The mechanism of this phenomenon is not completely understood. They decided that the geometry of the curvature determined by the spatial distribution of the evolved energy... Is this true?*

*Here is an experimental fact. Under normal conditions the time of the half-life of muon equals one and a half millionths of a share of second. Back in the 70s of the last century on the accelerator the muons able to overclock up to speed equal to 99.94 percent of the speed of light. The life expectancy of muons as was considered has increased in 29-fold. This fact is unequivocally has been attributed to the merits of the theory of relativity. However, the question about what happened with the space or how succeeded to allocate the time from the space-time continuum, if in accord to the general theory of relativity space and time do not exist separately, with all this was not raised.*

*Not all just on this issue and in the quantum-mechanical theory. Time here canonically is conjugated with energy, and in this case it is necessary to solve another problem: time to separate from the energy. Should take into account the energy factor: the faster a particle moves, the more energy must be expended to speed up its movement, because as is believed to its mass increases.*

*I have another explanation this. We have spent energy, have won (" have borrowed") the time of life from nature for a particle, i.e. we made work to slow down the process of half-decay (have provided for a kind of a "lethargy" for the particle). All of this is directly related with the payment for the time, this is "the contribution at the side of nature," the same as for the any another work which is aimed at reducing the entropy!? And space is not being. Space plays his usual role - "as a form of content" or of a "container" as you wish. Just you must pay for the increasing of an order in the nature, or the decreasing of entropy.*

*The world is arranged so that a man takes the energy for his existence from nature, and makes it by the extremely barbaric methods, destroying its natural order by means of*

*incineration or splitting, etc., not having any opportunity to repay the debt. And although the energy in a closed system as a whole, according to the science laws, must be preserved, but its quality steadily decreases. So perhaps and the constant amount of time would be maintained!? Energy and time, as they say, are not only canonically conjugate variables, but they might be essentially equivalent!?*

**Life and evolution are required to the acceleration in the inertial frame of reference (IFR) associated with world time!?** Organism must continuously perform the work to maintain the desired temperature, which goes on to overcoming the inertia in IFR is tied with the time by trying to speed up bioprocesses in the body, or more correctly, to borrow the time from nature in exchange for the energy of certain quality. And it seems that me, all of us, live in this world only owing to that we should uninterruptedly to unfasten to the Nature the "green joules" for the every moment of its existence. And in this sense **life is a struggle for time!** But it is not easy to prove it. But namely to hither mine irrepressible imaginations led me. And... in general, they and are not entirely mine. The idea of the world absolute time, as is well known, belongs to Newton. So, the situation with the "car-time" which has been examined higher tells us that we should return to the idea of absolute time of Newton at a new stage of knowledge about the world. Let's summarize our conversation.

## **9. Provisions, which I offer, so to speak, "to be defended" may to look like this:**

**1. Recognizing the universal unity and integrity (holism) of our World, based on the fact that all known local forces on the Earth and in space are a response of the nature on the violation of a balance at a certain level of organization of matter, and, in fact, there is relaxation, the gravitational force (gravity), inertia and mass should be considered as the induced property which is a consequence of the accelerated motion of bodies under the action of external forces.**

**2. Property of mass arises (is induced) in the bodies in response to the acceleration of the motion, exists only in the presence of acceleration, and varies with the acceleration of motion. (The converse also holds: the presence of the quality of mass indicates that the body is in accelerated motion).**

**3. The nature of this phenomenon, i.e. the gravitational and inertial masses is unified, is concluded in the general (universal) connectedness of our world as a single global process of Creation. So in that sense, the mass can be called as a measure of the overall global connectedness, which is manifested at all levels of organization of matter.**

**4. In all cases, when it comes to the mass of bodies in the Universe (inertial or gravitational), we are dealing with a phenomenon of nature, or rather, some form of transfer and transformation of energy.**

**5. Our world by its unity (and by integrity) obliged to the accelerated motion of the world as a one whole. Gravity is the effect of accelerated motion. The quality of the gravitational mass arises (is induced) in the body each time in response on an external force which is trying to disturb this very inertia. Mass is a dynamic characteristic of connectivity of the world, as the coefficient of proportionality between force and acceleration.**

**6. The main contribution to the so-called mass as the universal characteristic of connectivity of bodies in our world gives an accelerated expansion of the universe. It is the existence of universal acceleration  $a=d^2S/dt^2$ , which characterizes the recession of galaxies, creates the visibility of an inseparable connection of the space and time in the universe, which Poincare (and then Einstein and Minkowski) intuitive has felt and denoted as "continuum".**

**7. "Inertia" of the system of reference can be defined as a state of complete lack of gravitation in the body and mass. Pure inertia in our world is not, and can not be, the state of rest or uniform rectilinear motion is as a purely theoretical case.**

8. It is known that some scholars have questioned the accuracy of the spectral method of establishing the recession of galaxies (IR offset). The phenomenon of gravitation in the Universe which according to our hypothesis are the result of acceleration of bodies, confirms, firstly, himself fact of the universal universal connectedness (holism) of the world, and secondly, the himself fact of the accelerated recession of galaxies and, thirdly, the validity of the spectral test.

**9. We and are all around us - the effect of time. Time is one of the three greatest divine principles governing the world, which supports the temporality in the world, and two others are causation and rationality. Nothing else can not compare to them. Time, not is otherwise as the finger of God!**

**10. Time is in everything. We perceive its properties in the manifestations, thanks to the developed (in animate matter) ability to remember, compare and distinguish, inherent to the ontogenetic consciousness.** The time led out us "for the hand" and the world around us far off from the cold of the immobility and dead Eternity to light and life, and is leading to perfection.

**11. The whole world has inertia with respect to the motion of time. World time - there is an absolute inertial frame of our entire universe, with all the ensuing consequences.** We are all in the inertial "car-time" are moving, in some sense, "uniformly and straight" and therefore (as in the car with curtained windows) nobody the time does not see and do not notice, the instruments can not measure it, and of course nothing can not influence it.

**12. Life and evolution are required to the acceleration in the ISR is associated with world time. In order to live, we borrow the time in the Universe: you has spent the energy and received the time and life, and we will live untill we shall spend the energy...**

**13. The phenomenon of "life" consists in the uninterrupted struggle for the time!**

\* \* \*

That's so (or approximately so) as seems to me we should consider the nature of mass, gravity, inertia ... and all that is connected with it in our world.

It seems to me exactly this problem has not been haunted by the great thinker and scientist of the 20th century **Albert Einstein!** *"I'll send you a new edition of my book - Einstein wrote Solovine.- "The Meaning of Relativity", in which the generalized theory of gravitation is described in the new edition. Of course, this work is an attempt to create a unified field theory, but I would not want to produce a book under the pretension heading because I do not know whether contained in my theory of physical truth. "*

**P.S.** Higgs bosons, which are now in vogue it's just another, very beautiful, but the excessive metaphor which blocks path to the truth, in a word, "the idea of the Higgs!".

***"Gravity does not exist".***

***/Erik Verlinde/.***

Big hello to **Lev Borisovich!**

- You are certainly right, **dear Lev Borisovich,** we really are not allowed to speak that mass depends on the speed. The mass, or rather, the quality of the (property), which we associate with the concept of mass as a measure of inertia and gravity depends entirely on the acceleration, moreover, is generated (is induced) exclusively by acceleration!

***"Kinematic, static understanding of gravity" impossible "***, these words also belong to Einstein.

**Max Born: "Einstein's views represent a philosophical belief that there can be neither is proved nor disproved by physical arguments. The only thing that can be done in terms of objections to this view, is to formulate a different concept of reality. "[11].**

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