2. RELATIVISM AS A SPECIAL CASE OF NEWTON'S CLASSICAL MECHANICS

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Advocating the relativity theory priority, Einstein contrasted comprehensively one to Newton's classic mechanics, undergoing the latter to a strong criticism because of the inability to solve the dynamic problem for the region of high speed to be commensurable with the light speed. It is one of dramatic mistakes of the fundamental science, that discrowns a discovery of the static electromagnetic structure for vacuum field as a result of the quantization by elementary massless charges in me EQS theory.

In me equilibrium state the vacuum field is found to respond only to an external perturbation exerting on the masse m as a function of the velocity v. On the other hand, for the velocity function to be take into account, in Newton's equations one can introduce an additional force of vacuum field resistance $Ff(v)$, which is proportional to a perturbing force F and the velocity function $d(mv)/dt = F - Ff(v)$. Provided that the resistance to motion in the vacuum field (in the continuum case) is proportional to the squared velocity v to be asymptotically equal to the light speed C, one can obtain the following relation $1 - f(v) = (1 - v^2/c^2)^{0,5n} = \gamma^{-n}$, where n is a power index and γ is a relativistic factor. The introduction of an additional force for me vacuum field resistance results in the generality of Newton's equations for me whole range of me speeds, that is $\gamma^n m\, dv/dt = F$.

1. Introduction. The modern physics has been on a crossroad. There are two opposite viewpoints on the physics basis:

1) «The spatially - temporal continuum is employed only as an manifestation arena for fields and particles, which are alien for the geometry. They should be added to the geometry in order to be able to speak about any physics.

2) In the world there is nothing, excepting the empty curved space. The substance, the charge, the electromagnetism and other fields are only a demonstration of the distorted space. The physics is the geometry» [1].

Two well-known modern physicists (theoreticians Mizner and Willer) have formulated the two opposite essences of physics. But being relativism supporters and Einstein's followers they defend firmly the second point of view: «The physics is the geometry ».

But how to be those who are not engaged in the pure theory, who combines theory with experiment, observing the phenomena which are not inscribed into the empty curved space conception? To go further on a relativism way, or to follow absolute physical models, how it is required by the classical approaches to natural sciences?

The relativism is known to reject the presence of structure for space and to manipulate only by the geometry of total emptiness. Such approach results in a relativity principle, which essence, as a final result, is reduced to the behavior independence for physical objects on the properties and conditions of vacuum space. In other words, the relativity principle isolates the physical objects from the space.

On the other hand, the general theory of relativity (GTR) tries to describe the behavior of physical objects in the modified space-time. There is a paradoxical and contradictory situation, when somebody try to use the same principle (in the case it is the relativity principle) in the solution of problems, which realities he rejects. The exhibition of a logic inconsistency is obvious.

Asserting priorities of the relativity theory, Einstein was known to oppose comprehensively this theory to Newton's classical mechanics. He subjected the latter to a rigid criticism, ostensibly for an inability to resolve dynamics problems for the range of superhigh speeds commensurable with the light speed. He believed that the classical mechanics is only a special case of the relativity theory. But how such statement is correct?

The mathematical analysis power is generally accepted. But on the other hand, as joked Einstein: «Mathematics is a unique perfect way to drive himself for a nose. With mathematics help it is possible to prove everything». Taking advantage of the ingenious physicist advice I want to show that not all solutions of Newton's equations are known in the modern physics. If to approach more attentively to equation construction and analysis, Newton's equations are appear to cover the whole range of speeds, including relativistic ones. Thus need in the relativity theory is disappeared. The Newton equations

are universal.

At constructing any equation, the initial premises specified from the problem condition are primary. The solution result will depend on the equation basis. To receive a new interpretation for Newton's equations, it is necessary to introduce those parameters, which are merely lacking. For this purpose it is enough to familiarize with final results of Newton's researches on classical mechanics and to estimate the prospects outlined by Newton as priorities for the subsequent researches.

Finishing the fundamental work on classical mechanics Newton declares: «Until this moment I have stated the celestial phenomena and oceanic tides on the basis of the gravitation force but pointed no reasons of the gravitation». Then Newton finishes the work by the following paragraph, specifying the causes of the phenomena:

«Now something should be added about some thinnest ether, penetrating into all continuous bodies and being contained there, by which force and action at notably short distances the body particles are attracted mutually and coupled at the contact, the charged bodies act at long distances, both repulsing and attracting the near small bodies, the light is emitted, reflected, refracted, eluded and heating the bodies, any sensing is excited, forcing the members of animals to move by will, by transferring through fluctuations of this ether from the external sensing organs to the brain and from the brain to the muscles. But it can not be stated in brief, besides there is not sufficient store of experiences, which would specify precisely and demonstrate the laws of the ether action » [2].

In essence we have Newton's will for the next centuries, i.e. « it can not be stated in brief ». In the letter to Boyle from February 26 in 1673/74 Newton states in detail his viewpoint on the ether problem and on opportunity to explain the gravitation by the ether action:
1) «Firstly, I suppose that the whole space is filled by an ether substance capable to compression and expansion, the large elasticity...
2) I assume, that the ether penetrates into all usual bodies...
3)... the external ether becomes more rarefied, and the internal one is more dense and passes all intermediate stages of the density in the intervening space...

4) When two bodies, moving towards each to another, approach the ether between them is assumed by me to become more rarefied...» [3].

In the same letter Newton mentions indirectly the questions of ether resistance to movement.

In the previous report devoted to a discovery of superstrong interactions (SSI), the way out the present dual situation in the natural sciences (when the old theories is not capable to explain a variety of the natural phenomena and new ones meet a resistance from orthodox scientists) is found as a restoration of Lorentz's concept for motionless electromagnetic ether, which basic properties are described yet by Newton. The new idea is a well-forgotten old one [4].

Naturally, that 20-30 years ago the all proposals to return to the ether conception would be faced with the overall negative reaction from the scientific community as contradicting to the relativity principle. The certain time interval has been required to understand a subjectivity of the given principle. From the pragmatic viewpoint now the relativity theory does not feed the scientists by new ideas.

Here is a formulated viewpoint to the ether in the modern physical encyclopedia:

«The world's ether is a light ether, a hypothetical medium penetrating into everything, to which the science of last years attributed a role of carrier for the light and electromagnetic interactions in general.

Originally the ether was understood as a mechanical medium similar to the elastic body. Accordingly the light wave propagation was assimilated to the sound propagation in elastic medium and the strength for electrical and magnetic fields was identified as a mechanical tension. The mechanical ether hypothesis has met with serious troubles. For example, the orthogonality of light waves demanded the properties of absolutely solid body for the ether. At the same time there was no ether resistance to celestial body movement. At the end of XIX century the difficulties of the mechanical interpretation for ether have resulted in failure in creating the ether mechanical models. There was only single unresolved question on ether participation in body movement. The arising difficulties and contradictions were overcome in Einstein's special theory of relativity, which has removed completely the ether problem by abolishing the ether.

From the modern point of view the vacuum (the vacuum state) possesses some properties of usual material medium. However it should not be confused with the ether, from which the vacuum differs essentially, since the electromagnetic field is an individual physical object demanding no special carrier » [5].

It is not necessary to have ingenious mind to see the criticism inconsistency for the ether conceptions mentioned above. First of all it concerns to the statement, that in the past centuries the science considered the ether as a carrier of the electromagnetic interactions. On the other hand, the criticism was concerned with the mechanistic ether to be not related to the electromagnetic ether.

The criticism of the electromagnetic ether in modern physics is absent completely. A physical model of the electromagnetic ether was created only in 1996, after the discovery of an independent carrier for electromagnetic field - quanton (the elementary static electromagnetic quantum of space) in a form of electromagnetic quadrupole with quite concrete structure. As a result the theory of elastic quantized space (medium) (EQS) was created [4]. It was the first theory describing a structure of electromagnetic vacuum field and its properties.

The electromagnetic field is supposed to possess ostensibly no own field carrier. In this sense it is not a physical field. Really, the electrostatic field possesses a carrier in the electrical charge form. The magnetic field (let hypothetically) is described in terms of a magnetic charge concept. The gravitational charge is represented by the mass. Finally the EQS theory introduces an electromagnetic field charge (quanton) being simultaneously a spatial elementary quantum, from which the vacuum field is composed as the elastic quantized medium.

The need in the introduction of an own carrier for the electromagnetic field has become unavoidable, since in the electromagnetism the physics has remained at a level of semiempirical Maxwell's equations describing phenomenologically the electromagnetic processes but not explaining the causes of transformation of electrical field in magnetic one and inversely. The magnetic field turns out at unclear causes to be manifested as a result of the spatial topology modification at violating the electrical balance by the electrical current.

The vacuum is shown in the EQS theory to possess the electrical and magnetic properties due to quantization by electrical and magnetic charges linked in the space quantum. The electricity and the magnetism are incorporated by the nature. At modifying any of the components in space (electrical or magnetic), another component arises automatically. It is quite a different matter, that the space possesses the electrical asymmetry in a form of the free electrical charge excess. Therefore initially the electromagnetic balance violation in vacuum field is possible only through a free electrical charges movement (i.e. the current). For the first time the EQS theory allows to carry out an analytical conclusion of Maxwell's equations, as it is demanded by the classical approaches, by basing on realistic models for electromagnetic polarization of vacuum field.

But the main, the electromagnetic quantum of space (quanton) is a particle joining the electromagnetism and gravitation. All electromagnetic and gravitational events are played on the common area. It is a static electromagnetic vacuum field. In the vacuum the distinction between the electromagnetic processes and gravitational ones is that the electromagnetic processes are caused by a vacuum polarization and gravitational ones - by a spherical vacuum deformation. At the electromagnetic polarization of vacuum the quantum density for the vacuum field is invariant. At the gravitational interactions there is a change in the quantum density of medium. The change is observed as an elastic spherical deformation [4].

The local region part for the vacuum field, represented in force lines of the electrical and magnetic fields, is shown in Fig. 4 in [4]. It is a simplified model of the static electromagnetic discrete field penetrating the universe, with the discretization step of 10^{-25}m. From enormous tensions for the force lines in the vacuum field, arising at so short distances between the quanton charges, it is possible to consider the vacuum as an absolutely solid body. It agrees with the conceptions of Newton and Lorentz for the ether as an extremely elastic substation. But it is a specific electromagnetic substation having no analogue with the mechanistic ether.

Then how the usual material object, as a physical body, can move in the motionless ether by overcoming no resistance to movement? Having failed to answer the given question, ones have solved the problem simply by abolishing

the ether. But the problem has remained. Without the electromagnetic ether it fails to join the gravitation and electromagnetism, not speaking about the causes for the inertia, which is manifested constantly as a motion resistance to the vacuum field at dynamical vacuum perturbation.

So, one of the physics problems is a problem of movement in Lorentz's motionless electromagnetic elastic ether. Formally Newton's dynamical equations describe the bodies movement in a vacuum field taking into account the inertial resistance at vacuum field perturbation. But in order to understand the causes of movement, it is necessary to consider the physical body mass as an indivisible part of the vacuum field.

In [4] is shown, that the causes of mass formation for the elementary particles are hidden in a spherical deformation of the vacuum field, and the mass movement is a spherical vacuum deformation. The particle is an unbroken part of the vacuum field and indicates the corpuscle-wave dualism properties. Thus in the vacuum (similar to solid body) the particle movement as a whole is associated with a transfer of the spherical deformation in the vacuum field and a transportation of the massless perturbing charge (electron) and the group of the sign-alternating charges (nucleons).

The transfer of the perturbing massless charges, which are included in the particle structure, is not associated with the movement resistance in the vacuum field. But the vacuum field deformation transfer is due to specificity of the movement resistance in vacuum. Naturally, the movement resistance is related not only to the elementary particles, but also to all physical bodies consisting, at the end, of the elementary particles. The resistance to movement in vacuum possesses the specificity. The movement resistance is exhibited only at perturbing the vacuum field and increased naturally with the speed to be measured in the motionless vacuum field.

So, the problem to describe the movement in vacuum is reduced to solution of the problems for the inertia and inertial nonlinearity on the speed in vacuum. The modern physics does not know the causes of inertial movement for body. Why the body, accelerated preliminarily up to the certain speed, continues to move with the same speed in a direction of the speed vector? Accordingly to the modern mechanics the inertia is the specificity of the body accelerated up to the certain speed by itself. Now this answer to the given question is unacceptable for physics. It is necessary to know the causes and action of forces supporting the inertial movement of body in vacuum.

The transition of the body from one speed to another in the vacuum field is defined by a transient inertial process and associated with infringement in the established balance of forces. Thus the unbalanced additional force, which is included into Newton's dynamical equations, is manifested.

Before to add the new unknown forces for the vacuum field to Newton's dynamical equations, we shall consider the solution of Poisson's gravitational equation for the spherically deformed vacuum at its perturbation by a body.

2. Solution of Poisson's equation for external and internal regions of deformed vacuum field.
Still in the letter to Boyle Newton noted, that «the external ether becomes more rarefied, internal one is more dense and passes all intermediate stages of the density in space». Now the EQS theory gives a physical decoding to the given process by considering one of the moments of gravitational mass formation in the vacuum field as its spherical deformation specified by the external and internal regions.

Let's consider a formation process of the external and internal regions in the vacuum field for an example of nucleon mass formation, since the nucleons possess the sharp gravitational border between the external and internal regions of deformed medium. The EQS theory does not work with the old ether concept or its modern analog (the physical vacuum). The space properties are most correctly specified through a concept of the vacuum field, which is characterized in terms of the quantum density of medium.

Introducing a notion of the quantum density of medium in the well-known Poisson equations, which are initially intended to describe the deformation, we obtain a spatial equation for the spherically deformed vacuum. Then we can find a distribution for the quantum density of medium ρ_1 in the external region of the vacuum field (behind the gravitational border) and the quantum density of medium ρ_2 inside the given border (see equation (7) in [4])

$$\begin{cases} \rho_1 = \rho_a = \rho_o\left(1 - \dfrac{R_g}{r}\right) \\ \rho_2 = \rho_o\left(1 + \dfrac{R_g}{r}\right) \end{cases} \quad (1)$$

It is obvious, that on the gravitational border $R_s = r$, from (1) we receive a jump in the quantum density of medium $\Delta\rho$

$$\Delta\rho = \rho_2 - \rho_1 = 2\rho_o \frac{R_g}{R_s} = 2\rho_{ns} \quad (2)$$

$\rho_o = 3{,}55 \cdot 10^{75}$particle/m^3 is the quantum density for non-perturbed vacuum;

ρ_{ns} is a part of the quantum density of medium due to Newton's potential on the gravitational border.

Taking into account the jump (2) and assuming the constancy for the quantum density of medium inside the gravitational border we shall construct a distribution epure (see Fig. 1) for the quantum density of medium in space at spherical deformation of the vacuum field by, for example, a proton.

The processes occurring in the vacuum field are depicted clearly in Fig. 1 to be much more complex, than it is represented in modern physics. In the diagram the proton mass m_p is identified in terms of a cylinder with the height $2\rho_{ns}$ and the radius R_s, because the mass is formed at the cost of tightening the vacuum field by the gravitational border. In essence, the particle mass is a result of redistribution for the quantum density of medium. The increase in the quantum density of medium inside the gravitational border is possible only at the cost of the density reduction in the external region thereby providing the quantum density balance in the vacuum field as a whole

$$\rho_o = \rho_1 + \rho_n = \rho_a + \rho_n \quad (2)$$

The balance (2) is determined through the vacuum field continuity and the field properties as an elastic continuous medium. As in the vacuum field the principle of field superposition works, the epure from Fig. 1 for the deformed vacuum field can be applied not only to a proton but also to any body. Naturally the process of particle (body) movement in the vacuum field is associated with the spherical deformation transfer in the motionless vacuum field. The body movement is a model of epure Fig. 1 displacement in the vacuum.
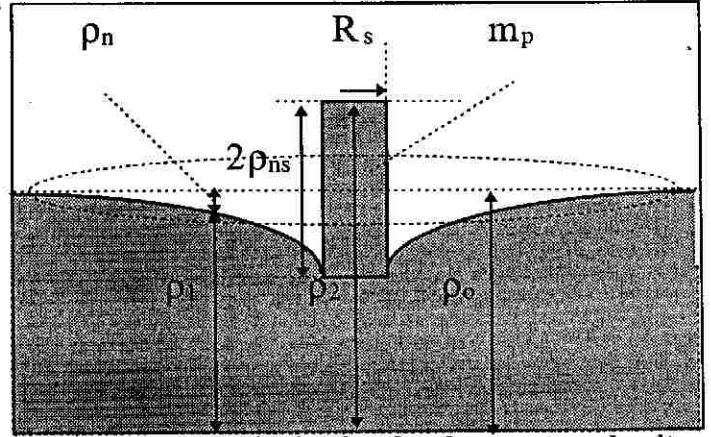

Fig. 1. Epure of distribution for the quantum density of medium at spherical deformation of the vacuum field by a proton.

3. Inertial body movement. For the first time the EQS theory considers the body movement as a transfer of spherical deformation for the electromagnetic vacuum field in space thus resulting a simple mechanical movement in the complex electromagnetic processes.

It is convenient to consider the physics of the mass transfer through single wave propagation in a continuous vacuum medium. The physical models, which are represented in the EQS theory for the analysis, are remarkable, since they help us to study the complex processes by avoiding the expensive experiments.

Let's consider a displacement of the deformation epure Fig. 1 in vacuum as an analogue of the body (mass) movement model. The inertial movement is shown in experimental observations to undergo no external resistance in vacuum. The realistic processes inside the vacuum field result in enormous forces and tensions, which are overcome by a body in vacuum through the inertia. Really, at body movement the epure Fig. 1 presses the non-deformed vacuum by the leading edge, thereby resulting in a vacuum deformation. The vacuum deformation is associated with the energy expense W_1 produced by the leading edge of the deformation epure. It is obvious, that the movement resistance force in vacuum F_1 will be determined as a derivative of the deformation energy in the movement direction x

$$F_1 = -\frac{dW_1}{dx} \quad (3)$$

The deformation energy of the motionless vacuum field will be specified in terms of the cross-section and the volume for a spatial vacuum tube at the body movement. For

a spherical body with the radius R_s and the mass density ρ_m the deformation energy will be determined by the reduced mass m_v for the vacuum tube

$$m_v = \pi R_s^2 \rho_m x \frac{4/3R_s}{4/3R_s} = \frac{3}{4} m_o \frac{x}{R_s} \quad (4)$$

m_o is the rest mass in the vacuum field, kg.

According to the mass-energy equivalence principle the total deformation energy of the vacuum tube to be penetrated by a moving body is defined in terms of the light speed C_o in non-perturbed vacuum and the body movement speed v to be taken into account by the normalized relativistic factor γ_n

$$W_1 = \gamma_n m_v C_o^2 = \frac{3}{4} \gamma_n m_o C_o^2 \frac{x}{R_s} \quad (5)$$

In the EQS theory the normalized relativistic factor γ_n provides the magnitude boundedness for the mass and energy of particles in the vacuum field

$$\gamma_n = \frac{1}{\sqrt{1 - k_n \frac{v^2}{C_o^2}}} \quad (6)$$

Where k_n is a normalization coefficient.

$$k_n = 1 - \frac{R_g^2}{R_s^2} \quad (7)$$

$$R_g = \frac{m_o G}{C_o^2} \quad (8)$$

It is necessary to note that in the EQS theory the gravitational radius (8) does not contain the factor of 2.
Substituting (5) in (1) we find the force of vacuum resistance to movement

$$F_1 = -\frac{dW_1}{dx} = -\frac{3}{4} \frac{\gamma_n m_o C_o^2}{R_s} \frac{x}{dx} =$$
$$= -\frac{3}{4} \frac{\gamma_n m_o C_o^2}{R_s} 1_v \quad (9)$$

Where 1_v is a unit vector in direction to the speed v.

The force of resistance (6) to movement in the vacuum field is shown to depend on the movement speed in vacuum, the rest mass and the body sizes. At non-relativistic speeds the force of movement resistance in vacuum is of 1,4

$\cdot 10^5 N$ for a proton and $6,4 \cdot 10^{34} N$ for the Earth. The vacuum is seen to represent a medium rendering the superstrong resistance to movement.

On the other hand, the vacuum represents a quantized medium, in which the movement resistance is determined by the leading edge of the deformation epure Fig. 1. And what happens with the trailing edge of deformation at body movement in the motionless vacuum field? The trailing edge of deformation recedes from the vacuum field thereby releasing the deformation energy, which results in creation of the force F_2 pushing the body in the movement direction. According to the energy preservation law the force F_2 is equal and opposite in direction to the force F_1 (9)

$$F_2 = -F_1 = \frac{dW_2}{dx} = \frac{3}{4} \frac{\gamma_n m_o C_o^2}{R_s} 1_v \quad (10)$$

It is obvious, that at inertial body movement the Newton dynamical equation should be written in the following form:

$$m_o \frac{d(\gamma_n v)}{dt} = F_2 + F_1 = 0 \quad (11)$$

In the EQS theory the rest mass is related to the absolute vacuum field and factored therefore outside the differential sign in (11) as a constant. The inertial movement is seen from (11) to be independent on the body movement speed. If the body (particle) is accelerated (even up to a relativistic speed), it will continue an inertial movement in given direction under action of the counterbalanced forces F_1 and F_2. The EQS theory does not modify practically the form of the well-known equations of movement but exposes the physical essence of the dynamical processes of movement in vacuum.

Thus the inertial movement is a complex energy exchange process occurring in the vacuum field. In the process basis there are the electromagnetic phenomena. Naturally, the electromagnetic processes in vacuum can be presented in a complex-valued form. In work [6] the speed of inertial body movement in vacuum is written in terms of the complex-valued speed υ

$$\upsilon = C_o e^{-i\varphi} \quad (12)$$

$i = \sqrt{-1}$ is the imaginary unit;
$e = 2,718$ is an irrational number;
φ is the argument, angular degrees.

It is necessary to note, the complex-

valued form for the body speed (12) in vacuum is a convenient form of process representation by the uniform equation, which takes into account not only the absolute speed v of body movement, and also the light speed in not-perturbed vacuum field C_o and the speed of vacuum field deformation (c) at bodies motion in field. The magnitude for the complex-valued speed (12) is determined by the limit light speed in non-perturbed vacuum field C_o and the parameters of system movement

$$C_o = \sqrt{c^2 + v^2} \qquad (13)$$

Equation (13) includes the real body speed v and the imaginary speed of vacuum deformation c

$$\upsilon = v + ic \qquad (14)$$

$$\upsilon = C_o(\cos\varphi + i\sin\varphi) \qquad (15)$$

The expressions (12 - 15) are inherent in description of the electromagnetic processes when the process components are represented by the real and imaginary parameters. It is the most interesting, that the expression (13) is a record form for Einstein's four-dimensional spatial interval, which essence follows not from the relativity principle but from the electromagnetic nature of motion mechanics for the vacuum field. For proofing the given statement we square the speed (13) and find the squared speed c^2 for vacuum field deformation

$$c^2 = C_o^2 - v^2 \qquad (16)$$

The expression (16) is a four-dimensional interval defined by the three-dimensional space axes (x, y, z) and the fourth temporal coordinate t

$$c^2 dt^2 = C_o^2 dt^2 - v^2 dt^2 = \\ = C_o^2 dt^2 - (dx^2 + dy^2 + dz^2) \qquad (17)$$

From (16) we find the speed of vacuum field deformation

$$c = C_o\sqrt{1 - \frac{v^2}{C_o^2}} = \frac{C_o}{\gamma} \qquad (18)$$

The deformation speed (18) takes into account the process delay in the vacuum field. The delay is determined in terms of the argument φ (12)

$$\varphi = \arccos\frac{v}{C_o} \qquad (19)$$

Fig. 2 shows the complex-valued speed on the phase plane. The phase delay φ_i is specified by the argument φ

$$\varphi_i = 90 - \varphi \qquad (20)$$

$$\upsilon = C_o e^{-i(90-\varphi_i)} \qquad (21)$$

At speeds, which are much less than the light speed, the speed (18) of vacuum field deformation is shown to be defined by the light speed in non-perturbed vacuum. The delay is absent (φ_i=0) (19, 20). It means, the deformation epure Fig. 1 will be transferred without distortion. At reaching the movement speed to the light speed the vacuum field deformation speed decreases thereby increasing the process delay (0<φ_i<90°). Hence the epure Fig. 1 will render a spherical compression and follow the spherical invariance principle, which is considered specifically in the subsequent report [7].
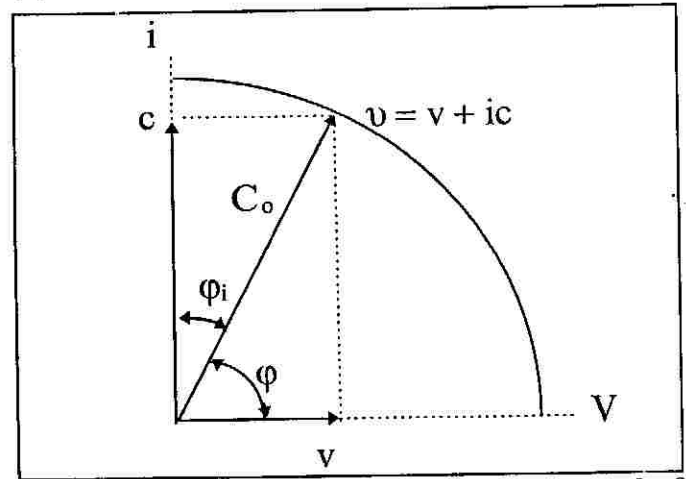

Fig. 2 Phase delay for the complex-valued speed of movement in the vacuum field on phase plane.

Now it is important to pay attention, that introducing the complex-valued speed (12), which takes into account indirectly the vacuum field deformation (18) and the delay angle for the process (20), results in the presence of the non-normalized relativistic factor γ by avoiding Lorentz's transformations

$$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{C_o^2}}} \qquad (22)$$

The non-normalized relativistic factor (22) defines the delay phase φ_i for the electromagnetic process of vacuum deformation at body movement in vacuum

$$\varphi_i = \arccos\frac{1}{\gamma} = \arccos\sqrt{1 - \frac{v^2}{C_o^2}} \qquad (23)$$

Thus, the inertial movement dynamics is shown in the mentioned arguments and the calculation to be determined by the electromagnetic structure of the vacuum field. The movement law nonlinearity associated with the speed increase up to the relativistic one has no relation to the relativism as a conception of empty space. The nonlinearity is determined by the electromagnetic structure for the vacuum field. The nonlinear process in medium is a manifestation of the electromagnetic phenomenon nonlinearity caused by delaying the wave processes when the speed is commensurable with the wave propagation speed in realistic quantized medium.

4. Conclusion of Newton's equations including the vacuum field resistance. The nonlinear processes of vacuum field deformation cause an additional resistance of quantized medium in the relativistic speed region. That can be an investigation object for Newton's equations at the presence of specificity for the given resistance. It is necessary to pay attention, in the EQS theory employing a notation "the relativistic speed" for the speed, which is commensurable with the light speed, is an indemnity to the traditional viewpont.

In the non-relativistic dynamical equations of Newton the specificity of the external force $\mathbf{F}$ is associated with a balance infringement in the vacuum field

$$m_o \mathbf{a} = m_o \frac{d\mathbf{v}}{dt} = \mathbf{F} \qquad (24)$$

Really, according to the vacuum field specificity the field, being in the dynamic inertial equilibrium (11), responds only to an external perturbation by the acceleration **a** without regard to the body movement speed. Till now, the classical and relativistic mechanics considered the inertial properties as properties inherent only to the body thereby not linking the body with the vacuum field. The inertia causes were not explained.

The inertia causes are shown in the EQS theory to imply that the body is created in the vacuum field as a result of spherical vacuum deformation by the particles included in the body structure. The body is an indivisible part of the vacuum field and the deformed quantized medium, which is linked with the field by tension of the electrical and magnetic force lines. The vacuum connects us. This fact is proved

experimentally at any attempt to be accelerated as an occurrence for the force **F** opposing to the acceleration. But having been quickened the system reaches the dynamic inertial equilibrium, which violation by deceleration will be manifested as an obstacle (due to the arisen force) to the deceleration. For overcoming the forces of vacuum field inertia it is necessary to apply a compensation for the external force **F** (24).

At a low speed of movement (far from the light speed), the movement dynamics is described in terms of Newton's classical equation (24), which inconsistency for process description in the relativistic speed range rendered Einstein's criticism. Now it is necessary to show that in this case Einstein's criticism was unreasonable and that if we introduce the resistance force of to the vacuum field F_r into Newton's equation, this equation becomes a relativistic one.

Owing to the vacuum nonlinear properties at speeds commensurable with the light speed the resistance force at movement in vacuum F_r is due to the retarded processes of vacuum deformation. But as follows from (11) the resistance force F_r will arise only at an external perturbation of the vacuum field by the force **F**. It allows us to express the resistance force F_r in terms of the perturbing force **F** (directed oppositely to F_r) and the coefficient of vacuum resistance k_r.

$$\mathbf{F}_r = -k_r \mathbf{F} \qquad (25)$$

Substituting (25) in (24) we obtain

$$m_o \frac{d\mathbf{v}}{dt} = \mathbf{F} + \mathbf{F}_r = \mathbf{F}(1 - k_r) \qquad (26)$$

The coefficient of vacuum field resistance k_r is determined in [6] for different cases. Generally the factor $1 - k_r$ may be represented in terms of the normalized relativistic factor γ_n in the following form

$$1 - k_r = \left(\sqrt{1 - k_n \frac{v^2}{C_o^2}} \right)^n = \frac{1}{\gamma_n^n} \qquad (27)$$

Where $n = 1,2,3$ is the order index.

Substituting (27) in (26) we obtain the universal equation of Newton's dynamics in view of the vacuum field resistance for the whole speed range including the light speed

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$$\gamma_n^n m_0 \frac{dv}{dt} = F \qquad (28)$$

For n = 1 or 3 the solution of equation (28) were received previously at describing an electron movement in magnetic field under the Lorentz's force action (n = 1) or in the linear acceleration regime (n = 3). For the photon radiation case (n = 2) the solution is found from the EQS theory [6]. Naturally, from the known relativistic equations the equation (28) is distinct by introducing the normalized relativistic factor.

Generally the normalized relativistic factor can be brought in the differential sign of (28)

$$m_0 \frac{d(\gamma_n v)}{dt} = F \qquad (29)$$

Then for each individual case the solutions for (29) should be found separately.

In (28) and (29) the rest mass m_0 is taken out the differential sign as a constant provided that the absolute movement speed v relative to the fixed vacuum field is known. If the absolute movement speed is not specified, the current mass m may be brought in the differential sign of (29)

$$\frac{d(\gamma_n m v)}{dt} = F \qquad (30)$$

Naturally, the solution (30) is associated first of all with definition of the integration constants fastened to the absolute vacuum field. It is necessary to note, that in the Earth conditions the dynamical observations of body movement may be considered as a movement in the fixed system, since the relativistic correction $(v/C_0)^2$ is negligible.

Thus, in Newton's classical mechanics equation the introduction of the vacuum field resistance to body movement is caused by nonlinearity of the vacuum properties for the range of relativistic speeds and transforms Newton's equations in the universal ones. It convincingly proves that the "relativism" (as a special manifestation of the vacuum field properties for the range of speeds commensurable with the light speed) is a special case of Newton's equations.

The vacuum was pointed not only by Newton but later also by Yarkovsky, Lebedev and other scientists [8,9] to should possess a specific resistance.

Basing on the absolutely false principle of relativity the relativity theory offers a independence concept for coordinate system movement with respect to the absolute space by having excluded this space. Only the relative movement keeping the physical process invariance is important.

Unfortunately till now the relativity principle is not investigated experimentally. All data obtained in the Earth conditions should be considered as data obtained in a coordinate system, which is motionless practically with respect to the vacuum field. In order to verify the invariance for the physical laws regardless to the absolute vacuum field it should to carry out an experiment on the researcher by placing him into the intergalactic spaceship capable to be accelerated up to a relativistic speed.

If in the experiment with increasing the flight speed the researcher will not be crushed by increased vacuum field pressure (since he is a part of the field) and his behavior and functionality will remain invariant relative to the spaceship, one can speak that the relativity principle is confirmed experimentally. While we observe an opposite picture. With increasing the speed the mass and energy grow as a result of interaction with the motionless vacuum field

5. Limit mass and energy for relativistic particles. The EQS theory returns the physics to an absolute space concept. It allows us to solve unsolvable (it would seem) problems in determination of the limit mass and energy for the relativistic particles. The solutions found from the relativity theory result to the relativistic non-normalized factor, which introduction gives the infinite mass and energy for particle at increasing the particle speed up to the light speed.

In this case the formula conclusion for the normalized relativistic factor (6) is not represented. Now it is important to show, that introducing the normalized relativistic factor allows us to find the limit mass and energy for an elementary particle at reaching the light speed by the particles in the vacuum field. From Newton's dynamical equation (28) for a linearly accelerated particle (n = 3) follows that with increasing the speed the electromagnetic mass for the particle increases

$$m = m_0 \gamma_n = \frac{m_0}{\sqrt{1 - \left(1 - \frac{R_g^2}{R_s^2}\right)\frac{v^2}{C_0^2}}} \qquad (31)$$

At reaching the light speed by the particle $v=C_o$. Then from (30) with the account (8) we find the limit particle mass m_{max}.

$$m_{max} = m_o \frac{R_s}{R_g} = \frac{C_o^2}{G} R_s \qquad (32)$$

The limit mass of a relativistic particle is seen from (32) to be defined in terms of the particle radius (the gravitational border of the particle in vacuum). For neutron and proton the gravitational border sizes are specified by the average radius $R_s = 0,81 \cdot 10^{-15}$m. For electron the gravitational border is "smeared" [4]. Nevertheless, in the limiting case the electron is believed to have mass no more than the proton (neutron) mass, which equals $1,1 \cdot 10^{12}$kg according to (32). It is the final mass and not so great in order to be not estimated as a realistic object. So for example, the iron asteroid with the same mass would possess the diameter of 65 meters only.

Following from (32) we obtain the limit energy W_{max} for relativistic particle

$$W_{max} = m_{max} C_o^2 = \frac{C_o^4}{G} R_s \qquad (33)$$

According to (33) at reaching the light speed by a proton the limit energy would be 10^{29}J. It is the enormous energy emitted by the Sun during the time, which is slightly long than four minutes, but the energy is limited.

In the report the causes of increasing the relativistic particle mass and the equivalence between the particle mass and the electromagnetic energy, which are associated directly to the vacuum field properties, are not mentioned in detail. It is a theme for the following report [7].

6. **Equivalence between inertia and gravitation.** Considering the causes of the nonlinear dynamic processes occurring in the vacuum field and to be described by Newton's equations, it is necessary, even in brief, to present the equation conclusion in the EQS theory for Newton's attraction F_n between two masses m_1 and m_2. The equation can be expressed through the vacuum field deformation D_{21} by the second mass

$$F_n = m_1 m_2 \frac{G}{r^2} = m_1 D_{21} \frac{C_o^2}{\rho_o} \qquad (34)$$

The inertial force F_{in} is distinguished from the gravitation force F_n by the vacuum field deformation (specified in terms of the deformation vector D_{12}) inside the gravitational border for the particle (body) m_1 at the acceleration a.

$$F_{in} = m_1 a = m_1 D_{12} \frac{C_o^2}{\rho_o} \qquad (35)$$

It is obvious, that the inertial force F_{in} is equivalent to the gravitation force F_n under condition of parity between the vacuum field deformation D_{21} in the external region for gravitation and the additional deformation D_{12} (35) inside the gravitational border of particle (body) for inertia, i.e. when $D_{21} = D_{12}$.

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FOUR REPORTS

ON THE THEORY OF ELASTIC QUANTIZED SPACE (EQS)

(Conference proceedings)

St.-Petersburg — 2000

Leonov V.S.

L 47   Four reports on the theory of elastic quantized space (EQS). (Proceedings of the Sixth International Conference «Modern Problems of Natural Sciences »,
August 21-25, 2000, St.-Petersburg, Russia)

The theory of elastic quantizedой space (medium) (EQS) is the first informal theory of electromagnetic structure of vacuum (to be exact, of vacuum field). In the basis of the theory EQS there is an electromagnetic quantum of space (quanton) discovered on January 1996. In the same year the first part of the theory EQS has been published (in 1997 - the second: «New Sources of Energy»).

Now the third part of the theory EQS «Synergetics of uniform vacuum field » is prepared for publication, the part of materials from which has been stated in the «Four reports»:
1. **Role of superstrong interactions at synthesis of elementary particles.**
2. **"Relativism" as a special case of Newton's classical mechanics.**
3. **Spherical invariance at the development of absolute cosmological model.**
4. **Benefit and harm of relativism for fundamental science.**

In essence the «Four reports» are an incomplete summary of the third part of the theory EQS, which represents the informal uniform theory of field. The joining particle (quanton) in structure of continuous elastic quantized medium (vacuum field) is an uniting criterion in the uniform theory. Joining both electricity and magnetism into electromagnetism and gravitation, the quanton is a realistic carrier of the electromagnetic field. Joining space and time the quanton is a carrier of time. The vacuum fields is a medium from that the elementary particles are synthesized and which joins the known fundamental interactions. The interaction of quantons inside vacuum field is the fifth type of superstrong joining fundamental interactions.

The theory EQS discoveries the enormous prospects in development of new power ecologically clean technologies based on production of excessive energy resulted from synthesis of elementary particles from the vacuum field. It is confirmed experimentally.

The author of the theory of elastic quantized space (medium) (EQS), the winner of the premium of Government of Russian Federation in the branch of science and engineering, the valid member of International academy of ecology (IAE), the candidate of engineering science Vladimir Leonov, who has discovered the elementary quantum of space - quanton in 1996, works in the field of development of quantum theory and its practical application in the newest power technologies, the opponent of construction NPS with reactors on uranium fuel as ecologically and economically unpromising.

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