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**FOUR REPORTS
ON THE THEORY OF ELASTIC QUANTIZED SPACE (EQS)
(Conference proceedings)**

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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 quantized 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 discovers 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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1. ROLE OF SUPERSTRONG INTERACTION IN SYNTHESIS OF ELEMENTARY PARTICLES

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It was an inherent carrier of electromagnetic field - the elementary quantum of space in the form of an electromagnetic quadrupole (quariton) that has been introduced in the field theory in 1996. The quanton integrates four elementary massless charges: two electric (-1e and +1e) and two magnetic (-1g and +1g) ones, related by the equation $g = C_0 e$ ($C_0 \approx 3 \cdot 10^8$ m/s is a light speed for non-strained vacuum field) at the orthogonal projection of electric and magnetic spatial axes in the quanton.

Explaining the laws of electromagnetic induction and electromagnetic perturbation propagation in the vacuum field the quanton couples the electricity and magnetism together. The size of me quanton is of an order of 10^{-25} m, the concentration (quantum density) is $\sim 10^{75}$ particle/m³. Interacting one with another, the quantons form an elastic quantized space (EQS), specifying the electromagnetic vacuum field statics and the fifth type of superstrong basic interaction, as well as giving the first explanation of the mass appearance for particles at their birth (fusion) in terms of a vacuum field strain (actual distortion of space).

1. **Introduction.** The fifth type of superstrong fundamental interactions, joining all known others, was declared in work [1] to be in Nature. Why the new type of fundamental interactions was introduced into theoretical physics if it would seem there are no objective reasons to do it? If there is the fifth force in nature, « physicists realize that they search for something extremely weak, hardly eluding from observation » [2,3] - is an academic science opinion accepted for a long time.

On the contrary I formulate the problem in an affirmative form. Really in Nature there is the fifth force determined by superstrong interactions. Ones ask: «How the realities of superstrong interactions are proved?» In order to answer this question, it was necessary to develop the essentially new physical philosophy concept, which was transformed in the theory of elastic quantized space (EQS) [4,5,6]. On the other hand, the statement, that the new idea is a well-forgotten old one is truly fair. Actually the EQS theory returns physicists to an initial point established by Lorentz's concept of electromagnetic motionless ether.

In his famous electron theory Lorentz wrote: « the ether, undoubtedly, differs essentially from any usual substance, we can make the assumption, that this medium, which is a carrier of electromagnetic energy and many - probably, of all - forces acting on a tangible matter » [7]. Thus, Lorentz has formulated an idea of joining for all interactions via the structure of electromagnetic ether.

Why the idea of Lorentz has not found the understanding of physicist in XX century, and was subjected even to severe criticism as

antiscientific one? The situation subjectivity has been explained himself by Lorentz: «I did not manage to receive the equations referred to moving axes in the same form as for motionless system equations; Einstein has made it in terms of a new variable system, distinguished slightly from equations introduced by me » [8].

The tragedy of physics in XX centuries is that Lorentz could not receive the necessary equations for motionless ether, which would satisfy to conditions of motion in it. But we shall present a situation, when Lorentz receives the equations. Then there would be no Einstein's theory of relativity. The paradoxicality of the viewpoint to natural science in XX century is defined by a skill to find and to solve the mathematical equations. If nobody could build and solve equations for the electromagnetic and motionless ether of Lorentz, the ether is not ostensibly in Nature.

But Nature does not depend on our consciousness and human abilities to think mathematically. The substitution of real physical models and the leaving from the classicism in theoretical physics to the subjectivism of mathematical imaginations have resulted the physical science in deepest crisis. The general theory of relativity (GTR), initially conceived by Einstein as a theory joining gravitation with electromagnetism, was not held even as a gravitation theory, since it could not establish causes of gravitational interactions.

There is no sense to subject GTR to the further criticism, since everybody criticizes it (excepting orthodox scientist). Now it is important to determine those directions in science, which lead the physics from the critical

status. In my understanding these directions have been formulated by Lorentz in a concept of motionless electromagnetic ether, as a carrier of all interactions (forces).

The modern physics operates in terms of four types of fundamental interactions: strong (nuclear), electromagnetic, weak (neutrino) and gravitational. The theory of electroweak interaction has allowed to join electromagnetism and weak interaction. It is doubtless, in order to join a strong interactions with all others the stronger force is necessary. That is a so-called superforce, which has expressed in the discovery of superstrong unifying interactions. Only the force can overcome other force. They are the firm laws of physics.

This fifth superforce in the EQS theory is the motionless electromagnetic ether of Lorentz, which is considered as an elastic quantized space with the strictly specified structure, possessing enormous tension and forces. In the basis of these enormous forces and tension there are the laws of electromagnetism.

Accordingly to the existing classification of types for fundamental interactions the electromagnetic interactions concede to the strong interactions in strength, occupying the second place in the general sheet of force rank. It is necessary to note that the present classification of fundamental interactions is conditional and determined by the time of course for known interaction processes. So, for example, the speed of nuclear processes (the strong interactions) is characterized by time of their course about $\sim 10^{-24}$ s. The electromagnetic processes occur during $\sim 10^{-21}$ s, that is slower by one thousand times. Weak interaction is slowest ($\sim 10^{-10}$ s). The time of gravitational interactions has not been found [9].

Such time approach to the classification of interactions does not promote the development of common understanding not only for the nature of elementary particles, but also the nature of things as a whole. Naturally, when one say about the joining of all interactions, the fifth type of superstrong interactions in the EQS theory is determined by an electromagnetic structure for Lorentz's motionless ether as an electromagnetic vacuum field, on which there are all other events including strong, electromagnetic, weak and gravitational ones.

The EQS theory considers all

interactions only on a background of vacuum field and with interaction with it. For this purpose it was necessary to reconsider the viewpoint to electromagnetism, not as the second rank force conceding to intranuclear interactions, and as the most important force forming other interactions. It is not necessary to confuse the wave electromagnetic processes in vacuum to a static electrical and magnetic tension of vacuum field, which represents itself the superstrong interactions.

Running forward I note, that such approach has allowed to receive a physical model of static electromagnetic spatial vacuum field, on the basis of which one built and solved necessary spatial equations for movement in motionless static field, which Lorentz tried to receive [6].

The presence of a structure for static electromagnetic vacuum field allows to exclude the Lorentz transformations from the equations and to refuse completely the relativity principle as a paradoxical phenomenon, which is unacceptable in the creation of an absolute model of space. Only such approach to the problem enables for the first time to join strong, weak and gravitational interactions from unified positions of electromagnetism. We live in the electromagnetic Universe.

Main, the discovery of quantized structure of space gives a new impulse in development of the quantum theory of elementary particles by specifying models of their synthesis from vacuum field. Before to consider the models and the structure of elementary particles it is necessary in brief to familiarize with the basis of vacuum field quantization, the detailed statement of which is represented in work [6].

2. Basis of electromagnetic quantization of vacuum field. The elementary particles cannot be considered in the absence of vacuum field, which indivisible part they are, defining spherical deformation of the field. Einstein has changed the real deformation of vacuum by a geometrical curvature, which establishes ostensibly the gravitational interactions.

The Einstein approach to the gravitation problem looks as a bending of empty space by a body and no more. Hence as a gravitational charge the body mass represents something firm, initially created in the empty space.

In the EQS theory the approach to the

gravitation problem is completely opposite to the Einstein approach. Thus the particle mass is considered as a result of spherical deformation of the vacuum field. That is the vacuum field synthesizes elementary particles. And the vacuum deformation in particle synthesis for different elementary particles is realized in different ways.

The particle movement in the fixed vacuum field is considered as a transfer of field deformation by subordinating the properties of such particle to a principle of the wave corpuscular dualism. The consideration of mass motion in the vacuum as a transfer of the vacuum field deformation has allowed to build and to solve the motion equations for fixed ether. However, these motion equations do not differ essentially from ones, known in the classical and relativistic mechanics and establish the final magnitudes for energy and mass particles of in all range of speeds, including light one.

In order to describe the laws of the vacuum field deformation in synthesis of elementary particles, it is necessary to know the field structure. In this case one can only say about specific electromagnetic structure of a vacuum field penetrating our Universe. And naturally, such structure can be determined by the electromagnetic quantization of vacuum by representing the structure, woven from a manifold of electromagnetic static quanta of space (it should not confuse to a radiation quantum).

In order to form new initial universal bedrock of World, it was necessary to determine initial constants lying in the basis the EQS theory. So, in the special theory of relativity (STR) it was postulated the light speed constancy rejected later in GTR. At establishing the hadron structure in quantum chromodynamics (QCD), three fractional electrical charges (quarks) appeared initially: $-(1/3)e$, $-(1/3)e$, $+(2/3)e$, where $e=1.6 \cdot 10^{-19} \text{ C}$ is the elementary electrical charge.

From the viewpoint of classical electromagnetism, the introduction of fractional electrical charges is nonsense. It has been to one of the reasons, explaining why the QCD models are not so universal and demand the introduction of more and more new parameters for description. The parameter number reaches up to 100, but all the same problems of the

strong interactions do not solve. But main, QCD predicted obtaining a quark-gluon plasma in accelerator at achievement by proton the energy of 200 GeV/nucleon, when the proton must "melt" to plasma. The higher energies are achieved but the quark-gluon plasma is not found experimentally. Even the experts in this area have enough of doubts in the basis of QCD [10].

Nevertheless, the QCD approach to matter structure at the cost of using the electrical charges is also applied in the EQS theory. Only the application vector and the amount for charges are changed. If in QCD the quarks are an initial building material only for one type of particles (hadrons), in the EQS theory the charges are a construction basis for the space structure and, accordingly, for the whole scale of elementary particles by forming a new universal particle - the space quantum called by **quanton**. Only four integer elementary massless charge are used instead of the fractional ones: two electrical ($-1e$ and $+1e$) and two magnetic ($-1g$ and $+1g$), joined in a unified design - the electromagnetic quadrupole.

In the EQS theory the electrical and magnetic charges as massless monopoles are separated from elementary particles, possessing the mass and being only carriers of free monopole charges. In space quantum (quanton) the joined monopole charges are considered only.

The choice of integer charges in the basis foundation of the EQS theory is explained by the most stable (external parameter independent) constant for the elementary charge from all known fundamental constants. Practically, all physical bodies are represented in general by electrically neutral material objects. It is explained by the electrical neutrality of atom in the non-excited state when the nuclear, proton charge is compensated by opposite charges of orbital electrons. The disbalance between the positive polarity charge of proton and the negative polarity charge of electron is inspected with the high accuracy level of $10^{-20} e$.

As to a problem of magnetic charges, the ratio between the electrical and magnetic charges, received for Dirac's monopole, was revised, since the initial presumptions in the Dirac equations for a magnetic monopole had been chosen wrongly [6]. The most precise ratio between the elementary electrical and magnetic

charges is given by the symmetric Maxwell equations for vacuum, from which it follows

$$g = C_0 e = 4,8 \cdot 10^{-11} \text{ Dc} \quad (1)$$

where $C_0 \sim 3 \cdot 10^8 \text{ m/s}$ is the light speed in a non-deformed vacuum field.

The elementary magnetic charge in (1) is measured in the Dirac units (Dc). The magnetic charges are not found experimentally in a free state. It confirms that they are really coupled by the electromagnetic quadrupole inside hereafter the indivisible space quantum (quanton) and belong to the quantized space, i.e. the electromagnetic ether, alongside with the electrical elementary charges. Some excess in the free electrical charges is specified by an electrical asymmetry of Universe. But the excess, similarly to a continuous vacuum field, defines conditions and a mechanism of elementary particles synthesis in vacuum.

The procedure of the electromagnetic quantization of space by charges is stated specifically in work [6]. It is important to understand, in order to allocate an elementary volume in space the four marking-off points are necessary only. Actually if we take only one point, in fixed space this point is adhered to space. Two points can form already a line as a segment of space. Three points allow us to allocate a surface in space and four ones - a volume.

So, from the geometrical minimization viewpoint the quantization procedure of space requires only four marking-off points. The transition from the geometry to physics is associated with a replacement of the geometrical points by physical objects. These objects were stipulated by Nature in the form of the mentioned four massless charges: (-1e, +1e, -1g and +1g). The built construction in the form of an electromagnetic quadrupole represents also an elementary static electromagnetic massless quantum of space - the quanton.

Naturally, we can not approach to the quanton structure even with a measure of elementary particles. From classical viewpoints, under action of enormous tension forces the four unlike charges in the quanton have to collapse in a point. However, using known conditions of the collapse restriction, the quanton sizes should be equal to the Planck length about 10^{-35} m [5]. At such quanton sizes the elastic properties of vacuum are shown in

further investigations to be so great, that they exceed the light speed by tens orders.

It means the quanton sizes should be much higher than the Planck length and is shown in calculation to correspond to sizes about 10^{-25} m . For this purpose there should be objective reasons which would prevent the monopole charges to collapse. Only the structure of monopole possessing certain sizes can be such reason.

The most probable structure of the electrical and magnetic massless monopole is presented in Fig. 1. In order to satisfy the conditions of an elastic state for the vacuum field the monopole sees to be a two-phase particle consisting of a central nucleus 1 surrounded by an elastic atmosphere 2. It is the nucleus 1, which is a source of field (electrical or magnetic) in a charge form. It is possible to assume, the monopole nucleus is determined by the Planck length. The physical nature of the monopole charges and the structure of their elastic atmosphere are not clear yet. We are able only to guess that the elastic atmosphere of the monopole defines electrical and magnetic properties of vacuum side by side with the monopole.

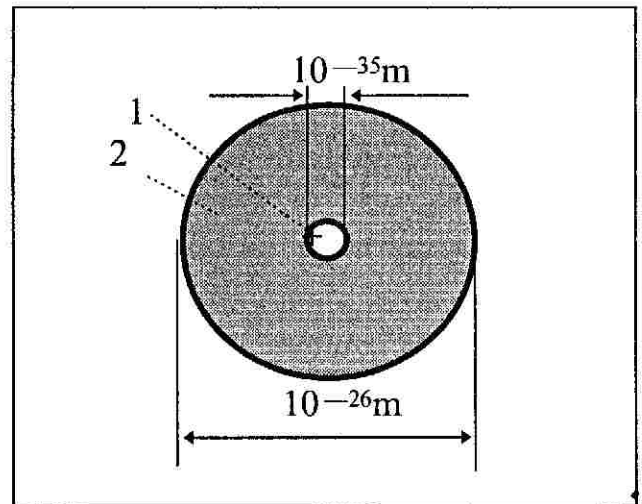


Fig. 1. Structure of electrical (magnetic) monopole: 1 - charge nucleus, 2- atmosphere

The monopole structure is shown by me to be described in the non-categorical form, since it is impossible to investigate directly its essence experimentally. Following from accumulated inferential results of investigations on the electromagnetic properties of vacuum, the monopole charges should satisfy certainly to the model shown in Fig. 1.

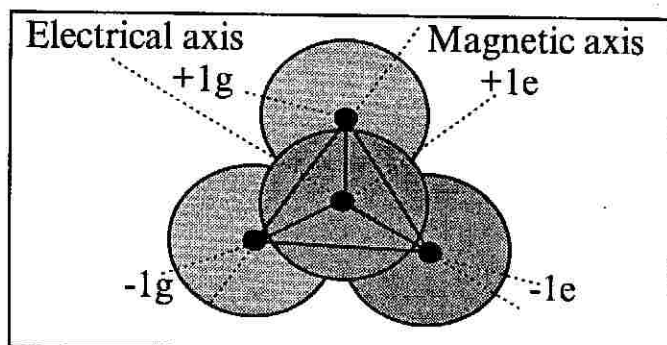


Fig. 2 Formation of space quantum (quanton) from four monopole charges in tetrahedron model for nucleus arrangement (top view).

On the basis of the physical model for monopole charges it is possible then to analyze a quanton formation process represented in Fig. 2. The four elastic balls - the monopoles - form a figure with the nucleus arrangement in the tetrahedron vertexes, providing the orthogonality of electrical and magnetic axes for the neutral quanton as a whole.

But the quanton can not remain in this state (Fig. 2). Naturally, the enormous forces of electromagnetic compression should deform the quadrupole from the monopoles to a spherical particle presented in Fig. 3, keeping the particle integrity and the orthogonality of the electrical and magnetic axes.

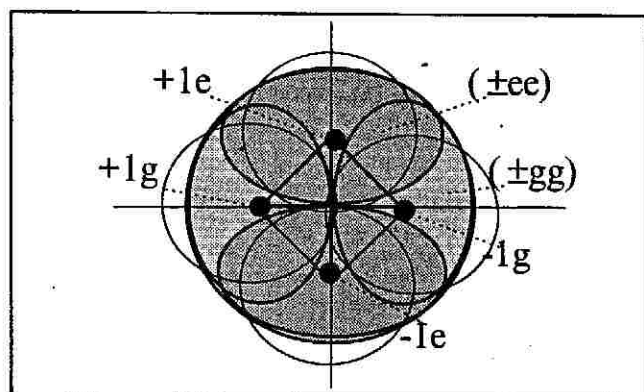


Fig. 3. Formation of spherical form for the quanton as a result of electromagnetic compression of the monopoles in quadrupole

In the EQS theory the quanton is represented in a ball form, with the mentioned four monopole charges (embedded inside the ball), which nucleuses are located in tetrahedron vertexes. Then it is very simple to imagine a process of large volume space quantization associated with its filling by quantons. Through the natural ability to couple opposite charges, the quantons link each with other and form a quantized elastic medium.

The tetrahedral form of monopole

nucleus arrangement in the quanton brings a chaotic element in the quanton coupling, orientates randomly their electrical and magnetic axes in space and excludes thus any priority direction in the orientation. The electrically and magnetically homogeneous isotropic medium, possessing electric and magnetic properties, is formed as a whole. The medium is called by the vacuum field.

Naturally, to present the structure of the discrete electrical and magnetic field of quantized space in a projection to plane is not possible. But the simplified model of a local segment in the vacuum field for the four quantons in a projection to plane is shown in Fig. 4 in terms of force lines of the electrical and magnetic fields. Of course, the vacuum field can be considered as a discrete mesh of force lines for static electrical and magnetic fields. The mesh is thrown over Universe and connects together everything. The vacuum field represents a static discrete electromagnetic field.

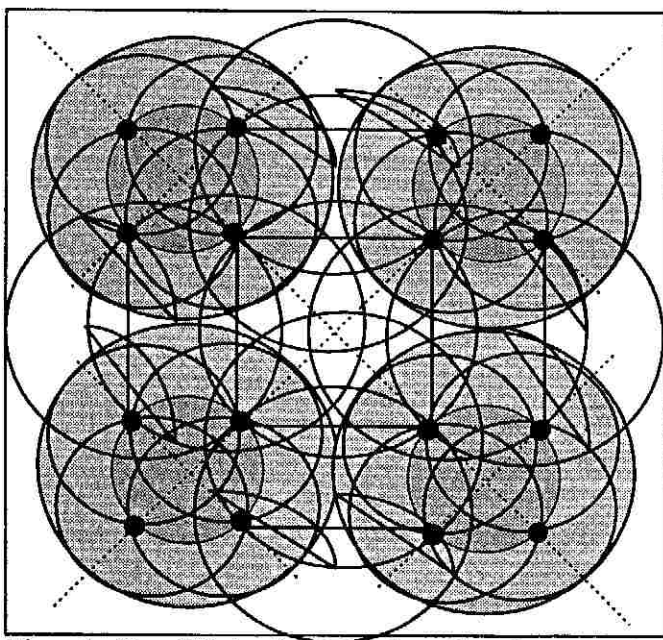


Fig. 4 Simplified diagram for the four-quanton interaction as force lines on local area of the vacuum field.

Due to the presence of a static electromagnetic field in vacuum the electromagnetic induction laws, associated with a violation of the electrical and magnetic balance of the vacuum field, work. The quanton ability to electromagnetic polarization has allowed for the first time to receive an informal conclusion for Maxwell equations. For vacuum the equations are represented in the symmetric form as the unified equation and specify the

equality between electrical (\mathbf{j}_e) and magnetic (\mathbf{j}_m) current displacement densities, provided that $\mathbf{j}_e \perp \mathbf{j}_m$

$$\mathbf{j}_m = -C_0 \mathbf{j}_e \quad (2)$$

After expression of (2) through a relevant modification of strength vectors for the electrical \mathbf{E} and magnetic \mathbf{H} vacuum fields, caused by an electromagnetic perturbation in time t , we receive the equations of electromagnetic induction for vacuum. According to the equations the change in the electrical field results in the electrical field induction. On the contrary, keeping the orthogonality of the vectors $\mathbf{E} \perp \mathbf{H}$

$$\frac{\partial \mathbf{H}}{\partial t} = -C_0 \epsilon_0 \frac{\partial \mathbf{E}}{\partial t} \quad (3)$$

Following from the conditions of electromagnetic tension for the vacuum field and tension perturbation by the spherical vacuum deformation at synthesis of elementary particles (proton and neutron), the sizes L_q for an electromagnetic static quantum of space (quantum) have been determined

$$L_q = \left(\frac{4}{3} k_3 \frac{G}{\epsilon_0} \right)^{\frac{1}{4}} \frac{\sqrt{eR_s}}{C_0} = 0,74 \cdot 10^{-25} \text{ m} \quad (4)$$

Where

$k_3 = 1.44$ is a factor of vacuum filling by spherically shaped quantons ;

$G = 6.67 \cdot 10^{-11} \text{ Nm/kg}^2$ is the gravitational constant;

$\epsilon_0 = 8,85 \cdot 10^{-12} \text{ F/m}$ is the electrical constant;

$R_s = 0,81 \cdot 10^{-15} \text{ m}$ is the proton radius.

For the first time the electromagnetic quantum of space was introduced into theoretical physics in January, 1996 [4]. Naturally there were doubts and mistakes, which were overcome later. The electromagnetic structure of space allowed to explain and to describe mathematically the most difficult and puzzling physical phenomena including the analytical informal conclusion for the Maxwell equations and the determination of energy limit for relativistic particles.

Knowing electromagnetic structure of space it is absolutely simple to specify the enormous tension and the boundless heat capacity for the vacuum field. For instance, at activation of 1 m^3 vacuum the released energy is equivalent to birth another Universe. The EQS

theory discovers the fifth type of superstrong interactions between the quantons in the vacuum field and entrusts a new concept for Universe.

3. Formation of mass in the vacuum field.

Practically, it is impossible to explain a phenomenon of mass formation for elementary particles without invoking a conception of superstrong interactions.

Let's allocate a spherical impenetrable border inside the vacuum field and compress it uniformly. It is obvious, the internal volume region will be compressed, and the external one will be stretched. The stretching will weaken with the distance from border. How is it possible to describe mathematically the given process? Initially for this purpose it is necessary to introduce a conception of the quantum space density ρ_0 for non-deformed vacuum field. The density is specified by the quanton amount in a volume unit

$$\rho_0 = \frac{k_3}{L_q^3} = \frac{1,44}{(0,74 \cdot 10^{-25})^3} = 3,55 \cdot 10^{75} \frac{\text{particle}}{\text{m}^3} \quad (5)$$

The quantum space density introduction allows us to make a transition from the discrete space structure to the continuum. In this case, the spherical deformation of the vacuum field results in a redistribution of the quantum density for elastic medium. The redistribution is described in terms of the well-known Poisson equation for elastic deformation. Thus the vacuum field deformation \mathbf{D}_a will be observed from the external part of border. The vector magnitude for the deformation is determined by gradient for the quantum density ρ_a of the deformed space medium.

$$\mathbf{D}_a = \text{grad} \rho_a \quad (6)$$

The presence of the vacuum field deformation (6) shows that inside the local region in the field there is a deformation source in the form of a gravitational charge. The charge is specified by the density of usual substance ρ_m (kg/m^3) and represented in terms of divergence for the quantum density ρ_a of medium

$$\rho_m = \frac{C_0^2}{\rho_0 G} \text{div grad} \rho_a = \frac{C_0^2}{\rho_0 G} \text{div} \mathbf{D}_a \quad (7)$$

The equation (7) is Poisson's equation in a vector form for the deformed vacuum field. From the equation it follows, that the birth of substance is caused by a vacuum deformation.

The space curvature is a consequence of the substance birth.

It is obvious, that the equation (7) results in the Gauss theorem for the mass as a gravitational charge

$$m = \frac{C_0^2}{\rho_0 G_S} \oint \mathbf{D}_a dS \quad (8)$$

From equation (8) follows, that for the vacuum field the flow of the deformation vector \mathbf{D}_a , penetrating through a closed surface around of the deformation center, defines the magnitude of the mass formed in the vacuum field.

The Poisson equation (7) for a spherically and symmetrically deformed vacuum has the simple decision as a result of integration. The decision allows to find the quantum density distributions for medium in deformed space outward from the deformation source center with the distance r .

$$\rho_a = \rho_0 \left(1 - \frac{R_g}{r} \right) \quad (9)$$

R_g is a gravitational radius, m [6].

Naturally, it possible to make a transition from equation (9) to Newton's gravitational potential and the gravitational field strength. The latter is a derivative from equation (9) and decreases inversely proportional to the squared distance. As against an electromagnetic polarization of the vacuum field, the gravitational interactions are characterized by a spherical deformation. But nevertheless, the electromagnetic and gravitational interactions are of the uniform nature based on the electromagnetism laws.

4. Synthesis of electron from the vacuum field. Naturally to describe the theory of synthesis of electron and other elementary particles in detail is not possible in the single report. Therefore the basic statements approving new approaches to physics of elementary particles will be considered.

Still never the theoretical physics considered causes of mass formation for elementary particles. It became possible due to a discovery of the electromagnetic structure for vacuum and a description of the vacuum field deformation in terms of the Poisson equation, which determines a particle mass as a result of spherical deformation for vacuum.

The mechanism of a spherical deformation for vacuum field by a monopole

charge is determined through the gradient forces arising as a result of vacuum field polarization by the central electrical charge. Actually, if one inserts a perturbing free massless electrical monopole charge of negative polarity in the vacuum field, in a local region surrounding the free charge the quantons will try to be oriented by the electrical axis in a direction of the radial electrical field of the monopole charge. Thus the quantons will try to be turned so that the positive polarity charge will be directed to the central monopole charge.

The diagram of the vacuum field polarization by the central monopole charge is shown in Fig. 5. For presentation the quanton projection in the plane is shown in a simplified kind, that the electrical and magnetic charges inside the quantons can be visible. As a result of the polarization orientation of the quanton the electrical gradient forces arise. The forces affect on every quanton in a direction to the central perturbing charge. Under action of this force the quantons are displaced to the central charge, deforming spherically the vacuum field.

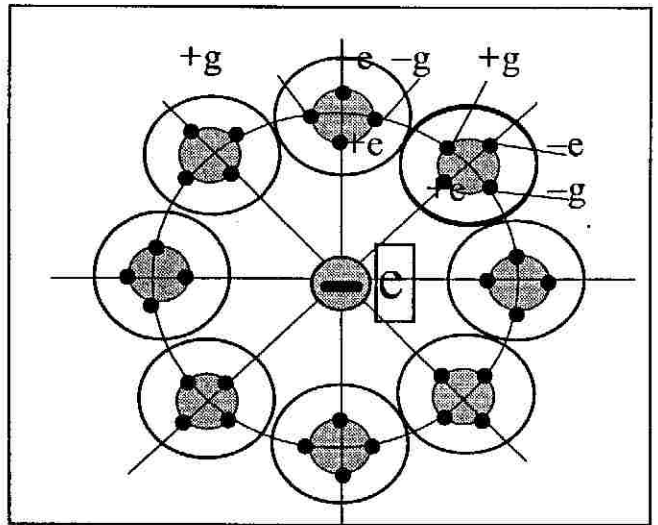


Fig. 5. To formation of electron mass as a result of vacuum field polarization by the central monopole charge of negative polarity.

Unfortunately, we are obliged to omit an intermediate calculation of the electrical force F_e , influencing on the quanton in a direction to the central charge, and to give immediately a final calculation result

$$F_e = \frac{1}{6\pi\epsilon_0} \frac{e^2}{r^2} \left(\frac{L_q}{r} \right)^3 \quad (10)$$

where $r^2 = \mathbf{r} \cdot \mathbf{r}$ is a direction of the radius vector (for a simplification of equation records).

The electrical force F_e is seen from equation (10) to decrease very quickly with a distance from the central perturbing charge, and the force action extends in vicinity of the charge. It shows that the electrical force is not main one for the processes of vacuum field deformation.

The advantage of the physical model (Fig. 5) allows us to estimate evidently other possible forces acting on the quanton in a direction of the central charge. The attentive inspection of the model in Fig. 5 shows that the magnetic axes of the quantons is locked naturally over the sphere and provides an enormous spherical tension of the vacuum field by the magnetic field. In vacuum the magnetism is intimately linked to the electricity through the quanton. In a direction of the central charge the normal component of magnetic force N_m is determined also through the electrical parameters of system with the account of (1)

$$N_m = \frac{1}{8\epsilon_0} \frac{e^2}{r^2} \frac{L_q}{r} \quad (11)$$

The relation of forces (11) to (10), acting on the quanton at the distance of classical radius of electron $r=r_e=2,8 \cdot 10^{-15}m$ shows, that the determining force in the spherical deformation of the vacuum field is a tension force for the magnetic spherical field of electron

$$\frac{N_m}{F_e} = \frac{3}{4} \pi \left(\frac{L_q}{r} \right)^2 = 3,6 \cdot 10^{20} \quad (12)$$

Thus, inserting a monopole electrical charge into the vacuum field creates sufficient forces in order to deform spherically the vacuum field in a direction of the central perturbing charge. Hence the massless electrical charge gets a mass and regenerates into an elementary particle - electron.

The magnitude of the vacuum field deformation for the recreated electron can be estimated by expression (9) in terms of the quantum density change at a distance of electron classical radius

$$\rho_a = \rho_o \left(1 - \frac{R_g}{r_e} \right) = \rho_o (1 - 2,4 \cdot 10^{-41}) \quad (13)$$

$$D_a = \text{grad} \rho_a = \rho_o \frac{R_g}{r_e^2} = 6,3 \cdot 10^{46} \frac{\text{particle}}{m^4} \quad (14)$$

At electron birth the magnitude change in the quantum density of medium is seen from equation (13) to be negligible and differs slightly

from ρ_o even at a distance of its classical radius in the range of enormous tension for the electrical and magnetic fields. It confirms that the vacuum field represents a superelastic medium. On the other hand, for electron the vacuum field deformation (14), specifying the variation in the quantum density of medium by gradient in space, is sufficiently appreciable.

For the first time, considering the electron structure the EQS theory has mentioned a problem of the spherical magnetic field for electron. The problem falls outside the frameworks of the given report and is considered intimately in work [6]. It is a physical analogue for electron spin, distinguished in essence from an anopole magnetic moment. The distinction between the spherical magnetic field and the electrical radial field of electron is that the spherical field is in equilibrium with the vacuum and is exhibited only in the local region of quanton interaction. The radial field of electron is determined by an infringement of the electrical balance for the vacuum.

By and large, in vacuum the electron has a certain structure, which is shown in Fig. 6.

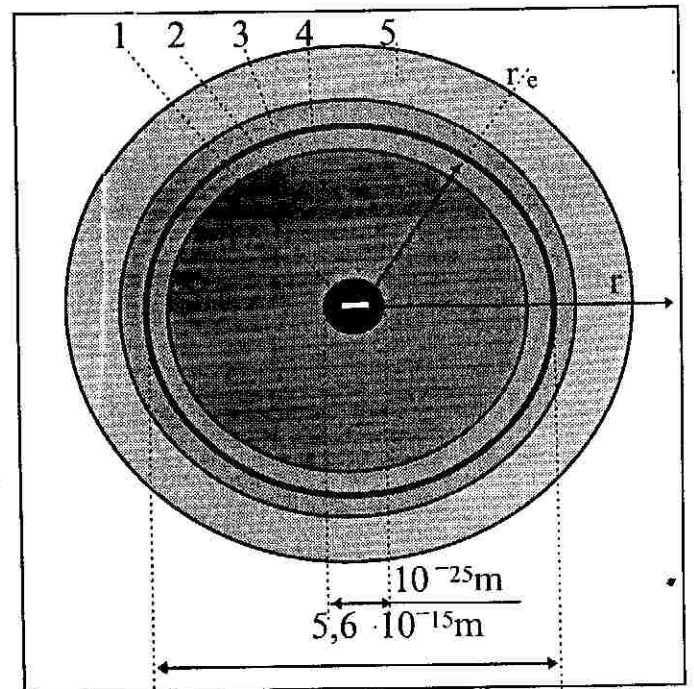


Fig. 6. Electron structure in the vacuum field. 1 - electron nucleus (electrical monopole of negative polarity), 2 - region of vacuum field compression by the spherical magnetic field, 3 - transient region, 4 - conditional border (classical radius electron), 5 - region of vacuum field rarefaction.

In the electron center the nucleus is a central monopole electrical charge of negative polarity. Around of the central charge the

region of a vacuum field deformation is created. Since, by virtue of specificity of formation by the central charge, the electron possesses no precisely expressed border between regions of compression and rarefying of the vacuum field, the electron structure is "smeared" over the vacuum in local region. The absence of exact superficial border for the electron is proved in experiment. By reason of the place deficiency it was not possible to result a diagram of the quantum density distribution of medium for electron, which shows, that the electron can be characterized only by conditional border described by the classical radius of electron at some assumptions.

By similar way the structure of positron can be represented where the place of electrical charge of negative polarity will be borrowed by a monopole of positive polarity.

5. Synthesis of proton and neutron in the vacuum field. As against the electron, the nucleons (proton and neutron) are characterized by the large mass up to ~ 1840 times exceeding the electron mass. Furthermore the nucleon sizes ($R_s = 0,81 \cdot 10^{-15} \text{m}$) are commensurable with the conditional sizes of electron.

The nucleon properties indicate that the vacuum field deformation by a nucleon differs considerably from the vacuum deformation by electron. Work [4] gives a shell model of nucleons, the shell for which is composed from electrical monopoles of negative and positive polarity in such a manner that the nucleon surface is represented as a mesh shell with the sign-alternating arrangement of charges in nodes of the mesh.

The sign-alternating shell of nucleons is shown in calculation to possess a considerably strong tension of the vacuum field in comparison with the electron field and to provide the needed mass for nucleons.

The nucleon cross-section with the sign-alternating arrangement of charges in nodes of the mesh shell is depicted in Fig. 7.

In Nature the similar mechanism of rolling-up shell structures is known for example of fullerene clusters [11]. The part of a nucleon shell for fullerene C_{60} is presented in Fig. 8.

Knowing the probable nucleon structure with a charge arrangement in the shell, it is possible always to calculate the shell tension corresponding to the nucleon mass. The charge amount in the proton shell is found (while

tentatively) in calculation to equal 69 charges, and for the neutron -70 ones. In the shell the proton has the single excessive charge of positive polarity as a result of the presence of the mesh cell defect in the shell structure (in Fig. 8 the cell defect is not shown). It is possible, that the mesh cells for proton are generated in such a manner that the presence of an excessive positive charge creates a stable shell design, which defines the proton stability.

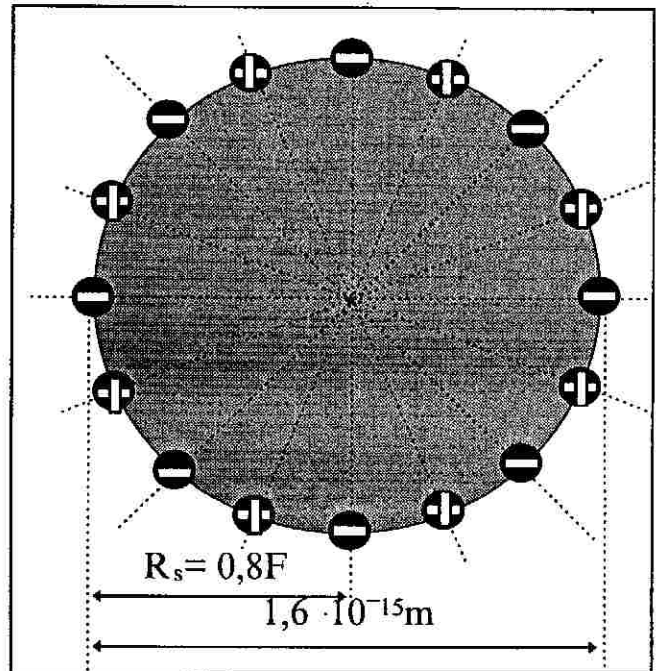


Fig. 7. Section of nucleon shell with a sign-alternating arrangement of electrical charges in mesh nodes

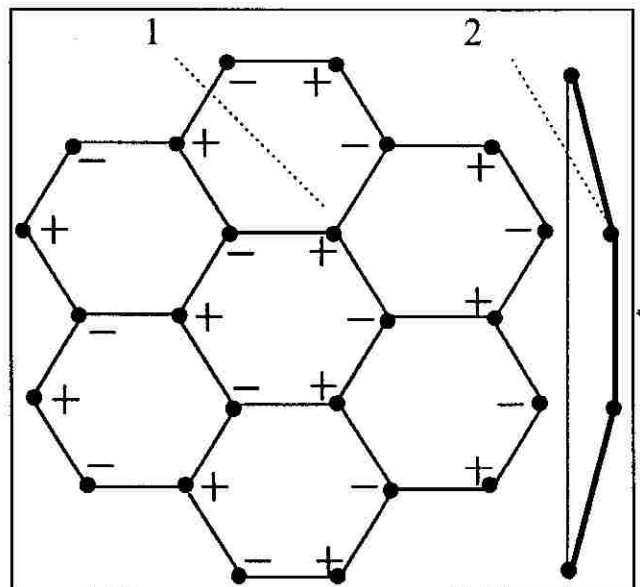


Fig. 8. Fragment of nucleon mesh shell by the pattern of fullerene C_{60} cluster.

The neutron can be formed as a result of capture of an orbital electron by the proton shell, when the positive excessive charge of

proton is compensated by an electron charge of negative polarity. It defines the instability for the neutron, which breaks down to a proton and an electron with antineutrino generation.

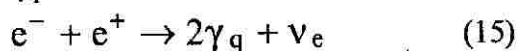
The nucleons contain charges both positive and negative polarity. This fact is proved experimentally for electron scattering by nucleons. It explains a quark introduction. But the quark model has appeared to be an ineffective direction in comparison with applying the integer electrical charges in shell models for nucleons.

Generally the whole scale of elementary particles, possessing the mass, is formed in the result of the vacuum field deformation by the central charge or various shells, some of which are stable and steady (as proton) or unstable and spontaneously break down in others.

The shell model for nucleon explains completely the nuclear forces as forces of electrostatic attraction between the sign-alternating shells. The electrostatic repulsive forces are shown from the received functional dependencies to act at the great distance between two protons. With decreasing the distance up to $\sim 10^{-15}$ m the forces of mutual attraction between the sign-alternating nucleon shells begin to affect. The forces are characterized by the properties of nuclear forces. It is contact short-range forces decreasing very quickly with a split of the shell from each other. If to bring the nucleons closer up to distances, which are shorter than those for the nuclear forces, the repulsion fork, caused by the presence of defects in the mesh cells of the particle shell, arises again.

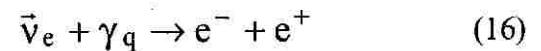
Naturally, at calculating the shell model for nucleons there are many problems, which are overcome finally. It is described specifically in work [6]. For the first acquaintance to the new approaches to elementary particle structure it is important to understand, that the elementary particle mass can be formed only as a result of spherical deformation of the vacuum field, irrespective of there is an excessive electrical charge for given particle, or the particle is electrically neutral as neutron.

The particles such as neutrino are exception. The electronic neutrino ν_e is formed in the result of an annihilation of electron e^- and positron e^+ with emitting two gamma - quanta $2\gamma_q$



Only the particle mass is shown in the annihilation reaction (15) to transform in radiation energy, defining the mass equivalence as a property of electromagnetic energy for the vacuum field deformation. In the rapprochement of electron and positron up to the annihilation distance, equal apparently to the classical radius of electron, there is a destruction of the radial electrical field and consequently the spherical magnetic field, which is transformed in a two-charge dipole field unable to keep the enormous spherical tension of vacuum. Hence the spherical field crashes and the energy transforms into the radiation. Another two massless electrical monopoles form electronic neutrino, a certain information bit saying that there was previously a pair of particles: electron and positron.

And on the contrary, the birth of particle pair (electron and positron) is possible only as a result of electronic neutrino splitting into two free electrical monopoles, which deform spherically the vacuum field by transforming in electron and positron at once. It is possible only when the gamma quantum with sufficient energy affects on an electronic neutrino $\bar{\nu}_e$ excited previously in the presence of a strong electrical field of atomic nucleus, (the arrow above neutrino shows, that it is excited, i.e. it is stretched previously in strong electrical field as a dipole)



Conclusion. The discovery of superstrong interactions (SSI) has been a result of development of experimental physics of elementary particles and atom nucleus in XX century. Up to the EQS theory the physics was a phenomenological science. Naturally, in the century origin Lorentz had no sufficient knowledge on the elementary particles, the electrical and magnetic monopoles in order to offer a real physical model for electromagnetic motionless ether, in which he trusted due to the enormous intuition of scientist.

Without SSI it is impossible to explain the mechanisms of mass formation for elementary particles at their synthesis from the vacuum field. To generate any particle (excepting photon) the vacuum field and the integer electrical charges appears to be necessary. It allows us to create the broad scale of elementary particles, as both stable long-lived

and short-lived unstable ones.

Naturally, the static electromagnetic quantum of space (quanton) is a basis SSI. The quanton is a spherically shaped complex particle capable both to polarization deformation (compression and stretching in axes, rotation) and spherical deformation (uniform compression and stretching). In the first case the vacuum represents electromagnetic properties, in second - gravitational ones.

The EQS theory changes the approach to a problem of association of all interactions.

Instead of the uniform universal formula for Nature the particle (quanton) joining electricity and magnetism in electromagnetism, electromagnetism and gravitation, electromagnetism and strong interactions, electromagnetism and space-time is discovered.

Really, the quanton is not only a carrier of electromagnetic field joining all fundamental interactions, but also the elastic volume resonator, a certain electronic timer specifying a course of time in space and dynamics for all processes.

The literature:

1. Leonov V.S. The fifth type of superstrong unifying interaction. In the proceedings: "Theoretical and experimental problems of the general theory of relativity and gravitation". X Russian gravitational conference. The theses of reports. - M.: 1999, - p. 219.
2. Aleksandrov E.B., Ginzburg V.L. About erroneous science and its propagandists. The bulletin of the Russian academy of sciences, volume 69, № 3, 1999, - p. 200.
3. Aleksandrov E.B. In searches of the fifth force. Science and life, 1988, № 1, - pp. 50-55.
4. Leonov V.S. The theory of elastic quantized space. - Minsk: Bisprint, 1996, - 156 p.
5. Leonov V.S. The theory of elastic quantized space. A part 2. New sources of energy. - Minsk.: Polibig, 1997, - 122 p.
6. Leonov V.S. The theory of elastic quantized space. A part 3. Synergetics of uniform vacuum field. Manuscript, is prepared to edition, 2000, - 510 p.
7. Lorentz G.A. The electron theory - Moscow: GIITTL, 1956, - p. 59.
8. Lorentz G.A. On a relativity principle. In: «Relativity principle», - Moscow: Atomizdat, 1973, - p 197.
9. Okun' L.B. Weak interaction. The physics encyclopedia. Volume 4. - Moscow.: The Great Russian encyclopedia, 1994, - pp 552-556.
10. Bogolubsky M.Yu., Meschanin A.P. To a uniform electromagnetic component of muon proton and neutron. A part first. Electron-positron concept. - Protvino: institute of high energy physics, 1997.
11. Lozovik Yu.E., Popov A.M. Formation and growth of hydrocarbon nanostructures - fullerenes, nanoparticles, nanotubes and cones. Successes of physical sciences. Volume 167 1997, №7, - p. 751-773.

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])

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

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/m³ 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.

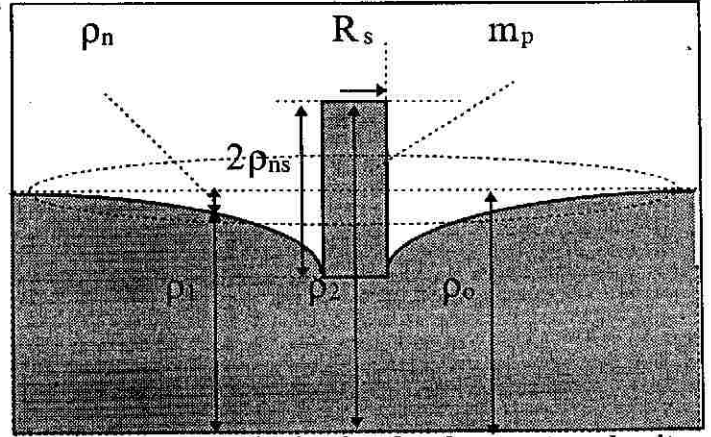


Fig. 1. Epure of distribution for the quantum density of medium at spherical deformation of the vacuum field by a proton.

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

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

Where $\mathbf{1}_v$ 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

$\cdot 10^5 \text{N}$ for a proton and $6,4 \cdot 10^{34} \text{N}$ 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)

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

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 v

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

$i = \sqrt{-1}$ 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 non-perturbed vacuum field C_0 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_0 and the parameters of system movement

$$C_0 = \sqrt{c^2 + v^2} \quad (13)$$

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

$$v = v + ic \quad (14)$$

$$v = C_0(\cos \varphi + i \sin \varphi) \quad (15)$$

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

$$c^2 = C_0^2 - v^2 \quad (16)$$

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

$$\begin{aligned} c^2 dt^2 &= C_0^2 dt^2 - v^2 dt^2 = \\ &= C_0^2 dt^2 - (dx^2 + dy^2 + dz^2) \end{aligned} \quad (17)$$

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

$$c = C_0 \sqrt{1 - \frac{v^2}{C_0^2}} = \frac{C_0}{\gamma} \quad (18)$$

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)

$$\varphi = \arccos \frac{v}{C_0} \quad (19)$$

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

specified by the argument φ

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

$$v = C_0 e^{-i(90-\varphi_i)} \quad (21)$$

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 ($\varphi_i=0$) (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 ($0 < \varphi_i < 90^\circ$). 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].

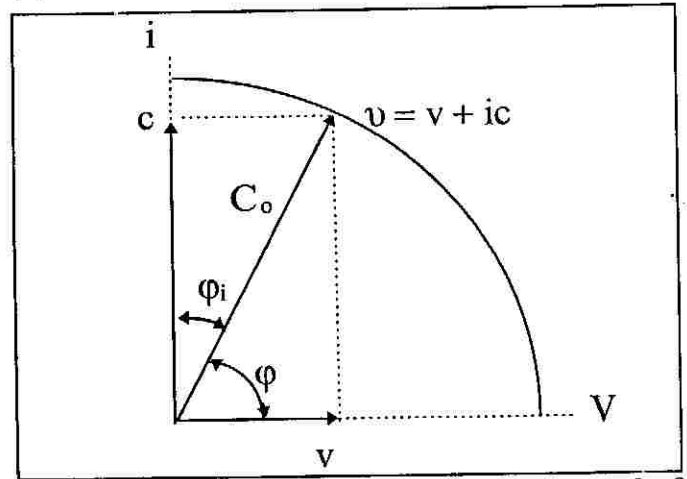


Fig. 2 Phase delay for the complex-valued speed of movement in the vacuum field on phase plane.

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

$$\gamma = \frac{1}{\sqrt{1 - \frac{v^2}{C_0^2}}} \quad (22)$$

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

$$\varphi_i = \arccos \frac{1}{\gamma} = \arccos \sqrt{1 - \frac{v^2}{C_0^2}} \quad (23)$$

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 viewpoint.

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

$$m_0 \mathbf{a} = m_0 \frac{d\mathbf{v}}{dt} = \mathbf{F} \quad (24)$$

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 .

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

Substituting (25) in (24) we obtain

$$m_0 \frac{d\mathbf{v}}{dt} = \mathbf{F} + \mathbf{F}_r = \mathbf{F}(1 - k_r) \quad (26)$$

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

$$1 - k_r = \left(\sqrt{1 - k_n \frac{v^2}{C_0^2}} \right)^n = \frac{1}{\gamma_n^n} \quad (27)$$

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

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

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)

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

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)

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

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

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

At reaching the light speed by the particle $v=C_0$. Then from (30) with the account (8) we find the limit particle mass m_{\max} .

$$m_{\max} = m_0 \frac{R_s}{R_g} = \frac{C_0^2}{G} R_s \quad (32)$$

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 $R_s = 0,81 \cdot 10^{-15} \text{m}$. 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 $1,1 \cdot 10^{12} \text{kg}$ 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

$$W_{\max} = m_{\max} C_0^2 = \frac{C_0^4}{G} R_s \quad (33)$$

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

$$F_n = m_1 m_2 \frac{G}{r^2} = m_1 D_{21} \frac{C_0^2}{\rho_0} \quad (34)$$

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 .

$$F_{in} = m_1 a = m_1 D_{12} \frac{C_0^2}{\rho_0} \quad (35)$$

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 $D_{21} = D_{12}$.

The literature:

1. Mizner C., Willer J. The classical physics as the geometry. Gravitation, electromagnetism, non-quantized charge and mass as properties of bent empty space. In: Willer J. Gravitation, neutrino and Universe. - Moscow. IL, 1962, - pp. 217-332.
2. Newton I. Mathematical beginnings of natural philosophy. - Moscow. Science, 1989, - p. 662.
3. Maxwell Дж., To. Speeches and articles. GITTL, - Moscow-Leningrad, 1940, - pp 222-223.
4. Leonov V.S. Role of superstrong interaction in synthesis of elementary particles (see the Conference Proceedings).
5. Ether the Physical encyclopedia. Volume 5. - Moscow. the Great Russian encyclopedia, 1998, - p. 664.
6. Leonov V.S. The theory elastic quantized space. A part 2. New sources of energy. - Minsk.: Polybig, 1997, - 122 p.
7. Leonov V.S. Spherical invariance in construction of absolute cosmological model (see the Conference Proceedings).
8. Yakovsky I.O. Density of light ether and ether resistance to movement. - Bryansk: a printing house Yudin, 1901.
9. Lebedev T.A. The law of mass change with speed. In: On some debatable questions of modern physics. A part 3, - Leningrad. the Leningrad polytechnic institute, 1956, - p. 43.

3. SPHERICAL INVARIANCE AT THE DEVELOPMENT OF ABSOLUTE COSMOLOGICAL MODEL

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Developing the theory of motionless ether (absolute space) Lorentz has made a mistake repeated then by Einstein which applied Lorentz's transformations without regard for any functional dependence of the light speed in vacuum on the vacuum field parameters. The electromagnetic quantization of the vacuum field in the EQS theory defines the discrete space structure specified for the medium in terms of the quantum density, that fixes the light speed C in vacuum. The quantum density of medium is not dependent on an electromagnetic polarization and determined only by a vacuum field strain in gravitation perturbations. The nonperturbed vacuum field is specified by the calibrating gravitational potential C_0^2 . At perturbing (straining) the gravitational potential balance is $C_0^2 = C^2 + \varphi_n f(v)$. The balance defines a spherical invariance of the vacuum field, where $\varphi_n f(v)$ is a perturbing Newton's potential as a function of the velocity in the absolute space (vacuum field).

The potential balance gives an accurate equation for the vacuum field and specifies the light speed in vacuum $C = C_0 \sqrt{1 - \varphi_n f(v)/C_0^2}$, where C_0 is the light speed in a non-strained vacuum field. The potential balance excludes infinitely high masses and energies. In Lorentz's transformations there is a simplified substitution of Newton's potential $\varphi_n f(v)$ by the squared speed v^2 giving an approximate balance $C_0^2 = C^2 + v^2$. The balance is characterized by a uncertainty lying in the basis of the relativity principle and resulting in solutions with infinitely high magnitudes.

1. Introduction. In two previous reports the new concept (developed for the first time in the EQS theory) for the old motionless electromagnetic Lorentz ether was affirmed. Starting in 1996, after discovery of the elementary quantum of space (quanton), the concept considers the concrete discrete structure of the ether as a static electromagnetic vacuum field. The electromagnetic quantization of space is resulted to filling the space by the quantons. On the level of space quantum sizes the obtained substation, called by the vacuum field [1,2], is a discrete medium with the discreteness of $10^{-25}m$.

However on the elementary particle (with sizes of $10^{-15}m$) level the vacuum field is considered as a continuum characterized in terms of the quantum density of medium for non-perturbed vacuum ρ_0 . In the case of field deformation perturbation the continuum is specified in terms of the *pro tem* quantum density ρ_a (the action density). The vacuum field possesses the remarkable property providing the quantum density balance for medium at its gravitational perturbation [2]

$$\rho_0 = \rho_a + \rho_n \quad (1)$$

where ρ_n is a part of the quantum density of medium attributed to Newton's perturbing gravitational potential φ_n , m^2/s^2

$$\rho_n = \varphi_n \frac{\rho_0}{C_0^2} = \frac{Gm}{r} \frac{\rho_0}{C_0^2} = \rho_0 \frac{R_g}{r} \quad (2)$$

Such simple expression (1) is basic in

describing a vacuum field state. Expression (1) together with (2) define a spherical deformation of space at gravitational interactions.

In the theory of relativity the state of the four-dimensional space-time is described in terms of Minkowski's interval, representing a notation form of Lorentz's transformation (see equation (17) in [2]). In the general theory of relativity (GTR) Einstein modified the four-dimensional interval into the energy - pulse tensor for substance. The tensor has not solved the problem of gravitational interactions and, on the contrary, has resulted in increasing the heap of mathematics thereby having deprived the gravitation of the physical electromagnetic essence embedded initially by the nature in a vacuum field deformation form.

In the work the unique properties of the balance for the quantum density of medium (1) are unraveled and the inconsistency of Lorentz's transformations in describing the processes in vacuum is demonstrated. As a result, we give a correct treatment for the results of Michelson's and Morley's experiments, which are undeservedly (during one century) accredited to experiments confirming Einstein's theory of relativity.

The principle of spatial dualism has been formulated in 1996. According to the principle the mathematical models describing the physical laws can give the absolutely identical final results of calculation if to take the space as the absolute emptiness (in STR), or to recognize the

space as a specific electromagnetic substation in a form of the elastic quantized medium (EQS). That was a period of establishing for the EQS theory and any competition with STR and GTR demanded the certain compromises.

Today, relying on the EQS theory results, obtained for so short time period and resulted to creation of the uniform theory of field through the joining vacuum field, my relation to the relativity theory is compromiseless as to an entirely erroneous theory. Despite of the inconsistency the relativity theory has played the colossal role in physics development by having obtained the mathematical equations, which have changed the scientific philosophy, through the purely formalistic techniques.

One of the merits of the relativity theory is a formulation of the mass-energy equivalence principle expressed by the elementary formula $E=mc^2$, which have no analytical conclusion corresponding to physical nature for this formula till now. But this nature is that the vacuum field is characterized in terms of the own gravitational potential C_0^2 determining the gravitational potential balance in deformed vacuum field.

2. Balance of gravitational potentials in deformed vacuum field. The uniqueness of the quantum density balance (1) lies in the fact that the balance is responsible for a gravitational potential balance in deformed vacuum field if to follow from the relation between the quantum density and Newton's potential (2)

$$C_0^2 = C_0^2 \frac{\rho_a}{\rho_0} + \varphi_n \quad (3)$$

In (3) there is a component of the action potential φ_a , which determines the gravitational potential decay in the vacuum field and corresponds to the quantum density of action ρ_a

$$\varphi_a = C_0^2 \frac{\rho_a}{\rho_0} = C^2 \quad (4)$$

The balance of gravitational potentials in the vacuum field can be represented in terms of two equivalent expressions with the account of (4) and $C_0^2 = \varphi_0$

$$\varphi_0 = \varphi_a + \varphi_n \quad (5)$$

$$C_0^2 = C^2 + \varphi_n \quad (6)$$

In such notation form the gravitational potential balance (5) is seen to be equivalent to

the balance for the quantum density of medium (1). In more rational form the gravitational potential balance for deformed vacuum field is represented by expression (6).

The gravitational potential balance is shown in the gravitational diagram (epure) Fig. 1 representing spherical deformation of the vacuum field for a perturbing mass m . The deformation epure gives a clear illustration of role for Newton's potential φ_n , which is subtracted from the gravitational potential C_0^2 of non-perturbed vacuum thereby forming a gravitational well. The well depth decreases with the distance r from the perturbing mass. In the epure the potential distribution inside the gravitational border R_s is not shown.

The gravitational diagram changes the view on the nature of gravitation by demonstrating that the perturbing mass results in a decaying gravitational potential of the vacuum field within the local spherical region around a perturbing mass.

If the perturbing mass is much more than a probing mass, the probing mass drops in the gravitational well under action of the Newton attraction forces. Naturally that in the basis of gravitational force nature there are an additional vacuum field tension obtained as a result of field deformation by the perturbing mass. The tensions create the quantized medium pressure on the probing body thereby forcing it to move towards to the perturbing mass. It is a concept of gravitation considered yet by Newton and realized in the EQS theory [2].

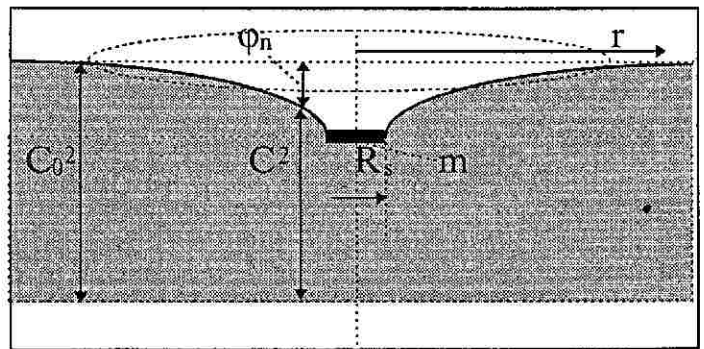


Fig. 1. Gravitational diagram (epure) representing spherical deformation of the vacuum field by mass m .

3. The light speed in vacuum. For the first time the EQS theory represents an expression for the light speed in a gravitation-unperturbed vacuum field

$$C_0 = \sqrt{\varphi_0} = \sqrt{C_0^2} \quad (7)$$

The expression demonstrates the unity

for the electromagnetic and gravitational processes in the vacuum field, in those basis there is the electromagnetic structure of vacuum.

So, the light speed in vacuum is determined in terms of the square root of the gravitational potential for the vacuum field.

According to the balance of potentials (6) at gravitational perturbation of the vacuum field the light speed in vacuum will be specified in terms of the action potential

$$C = \sqrt{\varphi_a} = C_0 \sqrt{1 - \frac{\varphi_n}{C_0^2}} \quad (8)$$

In the terrestrial conditions the light speed C may be accepted equal to C_0 .

At strong gravitational fields the increase in Newton's potential is seen from (8) to lead to decreasing the light speed in the vicinity of the deformed vacuum field. That fact agrees with all experimental data.

The substantial inhomogeneity of vacuum field in the vicinity of large cosmological objects possessing the strong gravitational field results in bending a light beam trajectory similarly to any inhomogeneous optical medium.

4. The light speed in black hole vicinity. The gravitational potential balance allows us to solve easily the problems to be not solved practically in GTR. In the vicinity of a black hole the strong gravitational field is treated in GTR to grasp the quanta of radiation thereby turning the black hole to invisible object. That is a very primitive explanation.

In the black hole vicinity on the gravitational border surface a spherical break of the vacuum field is supposed in the EQS theory to be obtained. It is a sole case in cosmology when the break of light-transmitting medium can be really obtained thus violating the medium continuity and interrupting the light movement both into and out of the black hole.

On the gravitational border of the black hole in vacuum the condition of continuity infringement for the vacuum field is specified by the balance (6)

$$C^2 = C_0^2 - \varphi_n = 0 \quad (9)$$

whence

$$\varphi_n = C_0^2 = \varphi_{ng} \quad (10)$$

Fig. 2 shows the gravitational diagram for a black hole as a distribution epure for gravitational potential in the hole vicinity. On

the black hole gravitational border specified in terms of a gravitational radius $R_s = R_g$ the Newton potential $\varphi_n = \varphi_{ng}$ is equal in the magnitude to the gravitational potential of non-perturbed vacuum field C_0^2 thereby breaking the vacuum field continuity.

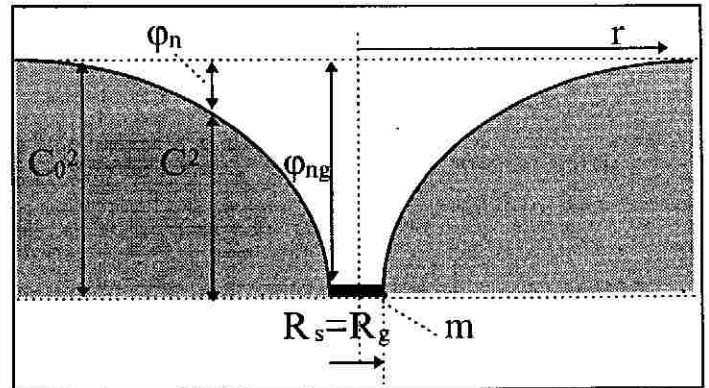


Fig. 2. Gravitational diagram (epure) for black hole.

Following from (10) we determine the value of gravitational radius

$$R_g = \frac{Gm}{C_0^2} \quad (11)$$

In the theory EQS the gravitational radius has not the factor 2 as in GTR.

5. Limit mass and energy of particle (body) in the vacuum field. Any particle inside the gravitational border R_s is indicated in the gravitational diagram for a black hole (see Fig. 2) to contain the limited amount of quanta belonging to the non-deformed vacuum field. The quanton presence determines the latent mass and electromagnetic energy of particle. They are the limit values for the mass m_{max} and energy W_{max} , which can be associated with the particle in the vacuum field. The condition (9) allows us to determine the potential mass and energy of particle as the particle limit parameters

$$\varphi_n = \frac{Gm_{max}}{R_s} = C_0^2 \quad (12)$$

Whence

$$m_{max} = \frac{C_0^2}{G} R_s \quad (13)$$

$$W_{max} = \frac{C_0^4}{G} R_s \quad (14)$$

For the objects such as a black hole the limiting parameters are realized as a result of static deformation for the vacuum field

6. Normalized relativistic factor. It is obvious, at reaching the light speed by a particle the particle mass and energy can not exceed the limit values of (13) and (14). It allows to normalize the relativistic factor γ excluding the infinite values for the mass and energy of particle in the relativistic speed range (when $v = C_0^2$)

$$\frac{m}{\sqrt{1 - k_n \frac{v^2}{C_0^2}}} = \frac{C_0^2}{G} R_s \quad (15)$$

Where k_n is the normalization coefficient obtained from (15) at $v = C_0^2$

$$k_n = 1 - \frac{R_g^2}{R_s^2} \quad (16)$$

With the account of (15) and (16) we get the normalized relativistic factor establishing the limit values for the relativistic particles

$$\gamma_n = \frac{1}{\sqrt{1 - \left(1 - \frac{R_g^2}{R_s^2}\right) \frac{v^2}{C_0^2}}} \quad (17)$$

It is obvious, at reaching the light speed the particle passes into the state of dynamic black hole with the limit mass (13), (15).

7. Analytical conclusion for rest energy of particle. The theory EQS gives the simplest and clearest conclusion for the rest energy of particle (body). Considering the vacuum field as an electromagnetic field, specified through the gravitational potential $\varphi_0 = C_0^2$ and joining gravitation and electromagnetism, it is easy to estimate a work W_0 associated with the transport of the gravitational charge (the rest mass m_0) from the infinity with zero potential into the region of the gravitational potential C_0^2

$$W_0 = \int_0^{C_0^2} m_0 d\varphi = m_0 C_0^2 \quad (18)$$

The situation described by (18) is realized at particle creation in vacuum field [1]. In the EQS theory the physical essence for the rest energy of particle (18) is treated as a manifestation of the energy of particle interaction with the vacuum field (the energy of coupling with vacuum). It is the gravitational energy of vacuum field deformation (equivalent

to the electromagnetic energy for spherically deformed vacuum) to be determined by the particle mass.

8. Equivalence between gravitational and electromagnetic energy in the vacuum field. The classical mechanics and GTR could not estimate the role of gravitational interactions, which are defined in the absolute space of vacuum field not by Newton's potential φ_n but by the gravitational potential of action $\varphi_a = C^2$ (9)

$$\varphi_a = C^2 = C_0^2 - \varphi_n = 0 \quad (19)$$

The classical mechanics find the work W as the transport of a probing mass m_2 from the infinity into the region of Newton's gravitational potential φ_n of a perturbing mass m_1 over the distance r between the masses

$$W = \int_0^{\varphi_0} m_2 d\varphi = m_2 \varphi_n = m_2 \frac{m_1 G}{r} \quad (20)$$

The EQS theory specifies the work W through the transport of a probing mass m_2 from the infinity into the vicinity of the gravitational potential of action φ_a of a perturbing mass m_1 .

$$\begin{aligned} W &= \int_0^{\varphi_a} m_2 d\varphi = m_2 \varphi_a = m_2 (C_0^2 - \varphi_n) = \\ &= m_2 C_0^2 - m_2 \frac{m_1 G}{r} \end{aligned} \quad (21)$$

Comparing (20) and (21) it is easy to notice the enormous distinction in the gravitational interaction energy for the range of weak gravitational fields, although the force F_n of Newton's interaction between the masses, both in that and another case, remains constant, since the derivative of the constant C_0^2 equals zero

$$F_n = \frac{dW}{dr} = m_2 \frac{d}{dr} (C_0^2 - \varphi_n) = \frac{m_2 m_1 G}{r^2} \quad (22)$$

Where $r^2 = rr$ (with the purpose of notation simplification).

9. Equivalence between gravitational and electrical energies for free electron. The field energy equivalence is evidently exhibited at electron synthesis in the vacuum field, when, due to electrical (and magnetic) polarization for the vacuum field by an electrical massless monopole charge (e), the spherical deformation of vacuum

field occurs and the electron mass is formed [1]

Let's equalize the energies of gravitational and electrical fields for a free electron in the vacuum field taking into account the calibrating potential C_0^2

$$m_e (C_0^2 - \varphi_n) = e\varphi_e \quad (23)$$

where φ_e is the electrical potential of electron, V

$$\varphi_e = \frac{1}{4\pi\epsilon_0} \frac{e}{r} \quad (24)$$

$\epsilon_0 = 8,85 \cdot 10^{-12} \text{F/m}$ is the electrical constant.

From (23) and (24) we find the overnormalized gravitational Newton potential φ'_n , which takes into account the gravitational interaction of the electron with the vacuum field and is expressed through the electrical parameters of electron in view of the electron classical radius r_e

$$\varphi'_n = C_0^2 - \frac{e\varphi_e}{m_e} = C_0^2 \left(1 - \frac{r_e}{r} \right) \quad (25)$$

$$r_e = \frac{1}{4\pi\epsilon_0} \frac{e^2}{m_e C_0^2} = 2,8 \cdot 10^{-15} \text{M} \quad (26)$$

Introducing the overnormalized Newton potential (25) for the vacuum field allows us to write the gravitational potential balance (6) in an overnormalized form

$$C_0^2 = (C^2)' + \varphi'_n$$

The non-overnormalized Newton potential φ_n takes into account no interaction of the electron with the vacuum field and determines only the force of gravitational interaction of the electron, for example, with a proton. This force is incommensurably weak in comparison with the force of electrical attraction between the particles.

Substituting (25) in (23) we find a distribution for the uniform energy of gravitational and electrical fields for the free electron coupled with vacuum

$$W = m_e (C_0^2 - \varphi'_n) = m_e C_0^2 \frac{r_e}{r} \quad (27)$$

So, the found expression (27) defines the equivalence of gravitational and electrical interaction of the electron with the vacuum field. At rapprochement to the electron the energy of gravitational and electrical interaction for the electron is seen to grow and to be equal to the rest energy at distance of the classical radius of electron.

Formulated by Einstein the principle of mass-energy equivalence, in essence, equalizes the energy of electrical and gravitational interaction of particle with the vacuum field.

Of particular role is the principle of equivalence between gravitational and electromagnetic energy at emitting an orbital electron.

10. Defect of orbital electron mass at emitting. In physics of orbital electron emission out of atom there is no shortage of questions to be answered. A source of electron emission is assumed to be the electrical energy change at electron transition from an exited orbit to the stationary one. But the mechanism of energy transformation is not clear. Moreover the electrical energy for an electron-proton system in hydrogen atom is increased actually at simultaneous emission of energy.

On the other hand, the realistic electron motion along orbit is very complicated and the single coil may be considered as a strongly elongated elliptic orbit (see Fig. 3). In this case the proton-electron distance is steadily varied as well as the energy of electrical interaction between the electron and proton is changed. But the electron does not emit.

To avoid the paradoxes in description of the orbital electron emission is shown in the analysis to be impossible without employing the gravitational interactions, by basing on their equivalence with the electrical interactions. In this case, the orbital electron emission is possible only as a result of the mass defect at abrupt jump-like transition to the stationary orbit.

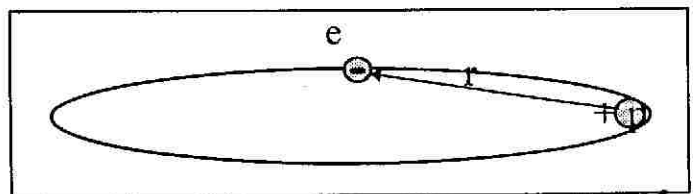


Fig. 3. Electron movement along strongly elongated elliptic orbit in atom.

No matter what orbit along which the electron may rotate, the orbital electron movement is shown in Fig. 4 to occur within a gravitational well of the nucleus (in our case it is a proton). At rapprochement of the electron to the proton from point 2 to point 1, the potential of action C^2 decreases. Since the electron mass is formed as a result of spherical compression of the vacuum field, the reduction of the electron gravitational potential is equivalent to decrease

in the quantum density of medium, of which the electron mass is created. In result, at transition from point 2 to point 1 the electron loses a part of the mass. If this process occurs spasmodically, the mass defect energy transforms into the energy of orbital electron emission.

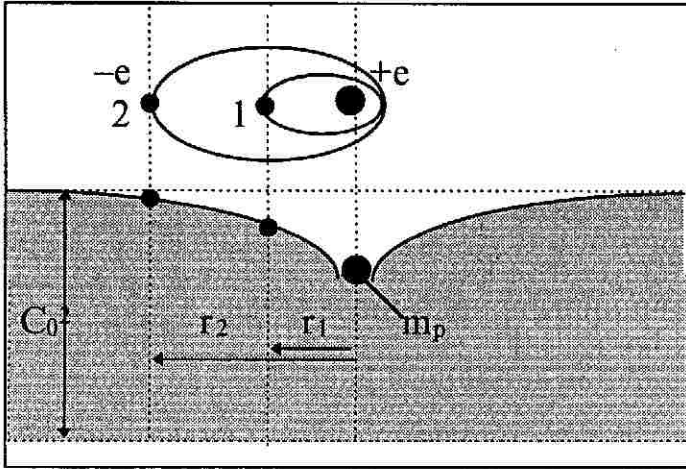


Fig. 4. To calculation of mass defect for orbital electron

Let's write the energy balance for orbital electron in atom in order to establish the range for the mass defect values. Let's designate the relevant energy components in the total balance by the sign plus at increasing the total energy of electron ΣW_e and minus at reducing: the rest energy $+W_o$, the kinetic energy $+W_k$, the electrical energy $+W_e$, the energy of electron mass defect $-\Delta W_o$, determining consistently the energy value

$$\begin{aligned} \Sigma W_e &= W_o + W_k + W_e - \Delta W_o = \\ &= m_e C_o^2 + \frac{1}{2} W_{el} + \frac{1}{2} W_{el} - W_{el} = \\ &= \Sigma W_e = m_e C_o^2 + \frac{m_e v^2}{2} + \frac{1}{8\pi\epsilon_o} \frac{e^2}{r} - \\ &- \frac{m_e C_o^2}{m_p G} r_e \varphi_n = m_e C_o^2 = \text{const} \end{aligned} \quad (28)$$

where φ_n is Newton's potential for proton.

$$\Delta W_o = W_{el} = \frac{m_e C_o^2}{m_p G} r_e \varphi_n = W_o \frac{r_e}{r} \quad (29)$$

The energy balance for orbital electron (28) shows, that on the stationary orbit the electron does not emit in view of constancy conservation for the electron energy $m_e C_o^2$ as

an completed system coupled with the vacuum field. The electron orbit trajectory can be different, not only circular but also with the variable distance r to the proton nucleus. Naturally, the electron energy balance establishes a correlation strictly between the gravitational and electrical energies thereby defining the speed of electron movement along the orbit.

The orbital electron energy attributed to the mass defect is seen from (29) to be specified by the same expression as for the uniform energy (27) of free electron in vacuum. The distinction is that the distance r in (29) is determined by a distance between the electron and proton and in (27) by a distance in vacuum to the electron.

Finally a part of the possible electron mass defect is transformed in emission

$$\Delta m_e = \frac{1}{2} \frac{\Delta W_o}{C_o^2} = -\frac{1}{2} m_e \frac{r_e}{r} \quad (30)$$

Even for the extreme case of Bohr's orbit distance the relative value for the orbital electron mass defect is notably low and equals

$$\frac{\Delta m_e}{m_e} = -\frac{1}{2} \frac{r_e}{r} = -2,7 \cdot 10^{-5} \quad (31)$$

At abrupt transition from the exited level state from point 2 ($r_2=4r_1$) on the first stationary orbit in point 1 ($r_1=0,53 \cdot 10^{-10}m$), according to (30) the orbital electron mass defect will be

$$\Delta m_e = -\frac{1}{2} m_e r_e \left(\frac{1}{r_1} - \frac{1}{r_2} \right) = -\frac{1}{2} m_e \frac{r_e}{r_1} \left(1 - \frac{1}{4} \right) \quad (32)$$

$$\Delta W_e = -\frac{1}{2} m_e C_o^2 \frac{r_e}{r_1} \left(1 - \frac{1}{4} \right) = -10,2 eV \quad (33)$$

The orbital electron mass defect (32) is completely equivalent to the emission energy of electron (33). At the abrupt change in the electron mass the gravitational energy in vacuum field is released as a result of the spherical deformation modification. Taking into account, that the vacuum field is analogue of solids, as a result of the mass defect the vacuum perturbation can generate only a photon with the transversal electromagnetic field. The problem on the possibility for the orbital electron to emit the longitudinal gravitational waves is not considered.

11. Balance of gravitational potentials for moving body (particle). The gravitational potential balance (6) for the vacuum field is represented

for a static case, which is applicable for the range of low speeds (much lower than the light speed). For moving dynamic object the balance of gravitational potentials takes into account the change in Newton's potential normalized by the relativistic factor γ_n (17)

$$C_o^2 = C^2 + \varphi_n \gamma_n \quad (34)$$

Whence

$$C^2 = C_o^2 - \varphi_n \gamma_n \quad (35)$$

$$C = C_o \sqrt{1 - \frac{\varphi_n \gamma_n}{C_o^2}} \quad (36)$$

The balance (34), (35) and (36) defines the spherical invariance of vacuum field for moving objects. It means, that the spherical deformation of vacuum field is a constant at any speed of particle (body) movement.

12. Total energy balance in deformed vacuum field. Let's obtain the total energy balance from the balance of gravitational potentials (34) by multiplying (34) by the limit mass (13)

$$C_o^2 m_{\max} = C^2 m_{\max} + \varphi_n \gamma_n m_{\max} \quad (37)$$

or

$$\frac{C_o^4}{G} R_s = \frac{C^2 C_o^2}{G} R_s + m_o C_o^2 \gamma_n \quad (38)$$

The expression $m_o C_o^2 \gamma_n$ in (38) specifies the energy of spherical deformation for the vacuum field by mass at any speed of body movement in vacuum. From (38) we find the remaining latent energy W_v of particle (body) in the vacuum field

$$W_v = \frac{C_o^4}{G} R_s - m_o C_o^2 \gamma_n \quad (39)$$

13. General solution of Poisson's equation for gravitational potentials. The classical mechanics describes the gravitational field in terms of Poisson's equation as the sum of partial derivatives of the second order from Newton's static potential. The solution for the equation is in finding a spatial distribution for Newton's potential and the gravitational field strength.

The spherical invariance principle for vacuum field allows us to write the Poisson equation for dynamics, expressing the partial derivatives through the gravitational potential of action φ_a

$$\frac{\partial^2 \varphi_a}{\partial x^2} + \frac{\partial^2 \varphi_a}{\partial y^2} + \frac{\partial^2 \varphi_a}{\partial z^2} = G \rho_m \gamma_n \quad (40)$$

The solution of the new Poisson equation permits to find a distribution of the action potential for the spherically deformed vacuum field in the whole range of speeds both in the external and internal regions of the gravitational border

$$\begin{cases} \varphi_1 = \varphi_a = C_o^2 - \varphi_n \gamma_n = C_o^2 \left(1 - \frac{R_g \gamma_n}{r} \right) \\ \varphi_2 = C_o^2 + \varphi_n \gamma_n = C_o^2 \left(1 + \frac{R_g \gamma_n}{r} \right) \end{cases} \quad (41)$$

where φ_1 and φ_2 are gravitational potentials correspondingly in the external and internal regions of the gravitational border, m^2/s^2 ,

$$\varphi_n = \frac{Gm}{r} = C_o^2 \frac{R_g}{r} \quad (42)$$

The solution of Poisson's equation is seen from (41) to result in the balance of gravitational potentials (36) for deformed vacuum field. It is natural, since in essence the Poisson equation is an equation describing elastic body deformation.

On the gravitational border there is a jump in the gravitational potential $\Delta\varphi$

$$\Delta\varphi = \varphi_2 - \varphi_1 = 2\varphi_{ns} \gamma_n \quad (43)$$

The gravitational potential jump is seen from (43) to be specified by the multiplier 2. The factor 2 is obtained also in the Schwarzschild solution for a centrally symmetric field of gravitation as 2φ [4]. But the Schwarzschild solution is shown from the solution of the gravitational equation for a spherically deformed vacuum field in the EQS theory to be erroneous, since it take into account no jump of potential on the gravitational border. As a result, owing to a mistake in the solution the multiplier 2 passes in the expression for the gravitational radius thereby overestimating unreasonably its value twice.

Fig. 5 represents a distribution epure for the gravitational potential in spherically deformed vacuum field. The epure is constructed on the basis of the solution (41) provided that $\gamma_n=1$ (the range of non-relativistic speeds). On the gravitational border R_s there is a jump in potential $2\varphi_{ns}$. For the range of relativistic speeds the deformation of vacuum

field grows thereby increasing the perturbing mass m . In the epure it will be depicted through the depth increase for the gravitational well and the jump in potential on the border.

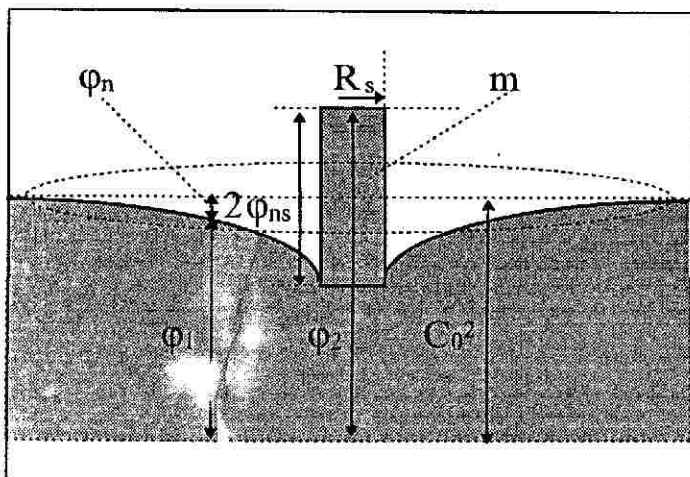


Fig. 5. Distribut on epure for gravitational potential at spherical deformation of vacuum field.

The epure of gravitational potential distribution is shown to be similar to the distribution epure for the quantum density of medium in spherically deformed vacuum field (see Fig. 1 in [2]).

For the range of relativistic speeds the EQS theory explains the particle mass increase by simple capture of quantons from the external region of the gravitational border into the internal one. It is possible only for the high speed range due to the vacuum field deformation delay. But in any case, the increase in the quantum density inside the border is possible only at the cost of density redistribution from the external region. Taking into account the enormous tension of the vacuum field, the gravitational border keeps a spherical shape.

Generally, the gravitational border should be considered as a mesh ensuring the vacuum field deformation transfer in the absolute motionless Lorentz's space [2]. The mesh reminds a fishing net, which tension is increased with the net speed relative to the water.

14. Spherical invariance and Michelson's experiment. The discovery of the spherical invariance principle for vacuum field in the EQS theory allows to eliminate a century mistake in analyzing the light speed under the terrestrial conditions and to show that the experiments of Michelson and Morley in past century has proved experimentally this principle. Now, the negative results of the experiments of Michelson

and Morley on «the ether wind» detection are treated wrongly as experiments proving the absence of the light-transmitting medium in the nature.

In first, the modern physics does not know the laws of light propagation in the deformable vacuum field as in a light-transmitting medium. In the relativity theory this unknowingness is provoked by the erroneous rejection of the idea of the existence for such medium, by recognizing the space as the absolute emptiness and the electromagnetic field as an autonomous substation possessing no own carrier.

Secondly, the calculations, associated with the Michelson and Morley experiments on determination of the light speed in directions to and against the Earth movement, are erroneous. They are postulated on a false concept that the light speed is a speed in a mechanistic (but not electromagnetic) ether, when the light source generates a spherical wave but itself is displaced relative to the wave front in the movement direction similarly to the acoustic wave from a source moving in air. In this case the calculated speeds of light and Earth are subtracted ($c-v$) or summed ($c+v$) correspondingly for the equal or opposite movement directions. The obtained calculation difference in ray path lengths was sufficiently to measure the light speed with using Michelson's interferometer, which sensitivity was ± 1 km/s relative to the light speed [3].

In order to demonstrate distinction in the approaches to the speed light, we shall write the balance of gravitational potentials for the EQS theory (35) and the conditional balance of gravitational potentials for the relativity theory following from Lorentz's transformations or from the four dimensional interval approach (see (16) in [2])

$$C^2 = C_0^2 - \phi_n \gamma_n \quad (44)$$

$$c^2 = C_0^2 - v^2 \quad (45)$$

The equation (44) is an exact equation describing the vacuum field state. The relativity theory, by having alternated the gravitational potential $\phi_n \gamma_n$ to the squared light speed v^2 , gives only a rough approximated description for the space state. Therefore, in the relativity theory even the extreme complication of mathematical means can not resolve the current problems of physics.

The exact expression for the light

deviation in vacuum (44) gives considerably low value in comparison with (45). It is caused by that in the nonrelativistic speed range the perturbing Newton's potential φ_n is of the primary parameter influencing on the light speed change. The relativistic factor γ_n is of secondary importance for the light speed change. But without the gravitational potential the estimation of the movement speed influence is senseless.

Despite of this fact, we shall find the light speed deviation σ_v , which gives the approximated balance of potentials (45)

$$\sigma_v = \frac{C_0 - C}{C_0} = 1 - \frac{C}{C_0} = 1 - \sqrt{1 - \frac{v_0^2}{C_0^2}} \quad (46)$$

We expand (46) in the power series and reject the terms of higher orders in view of their low values. Finally we obtain the required deviation by taking into account that for the solar system and Earth the maximal speed of movement in the absolute space is of $3 \cdot 10^5$ m/s

$$\sigma_v = \frac{1}{2} \left(\frac{v_0}{C_0} \right)^2 = 0,5 \cdot 10^{-6} \quad (47)$$

Following from the formula (47) for the Earth conditions the deviation of the light speed value is less than one part from a million. In the absolute units it equals about 150 \dot{m} /s.

The deviation for the light speed value in deformed vacuum field of the Earth σ_φ is determined by the value of Newton's gravitational potential of the Earth from the exact balance of gravitational potentials (44) at $\gamma_n=1$

$$\sigma_\varphi = 1 - \frac{C}{C_0} = 1 - \sqrt{1 - \frac{\varphi_n}{C_0^2}} \quad (48)$$

Expanding (48) in the power series and rejecting the terms of higher orders in view of their low values we obtain the deviation of the light speed value σ_φ for gravitational field of the Earth (the mass $m = 6 \cdot 10^{24}$ kg, the radius $R_3 = 6,37 \cdot 10^6$ m, the gravitational radius $R_g = 4,45 \cdot 10^{-3} M$

$$\sigma_\varphi = \frac{1}{2} \frac{\varphi_n}{C_0^2} = \frac{Gm}{2C_0^2 R_3} = \frac{R_g}{2R_3} = 0,35 \cdot 10^{-9} \quad (49)$$

The deviation of the light speed value in neighborhood of the Earth surface is less than one part from a milliard in comparison with the

non-deformed vacuum field. In magnitude it will be only 0,1 m/s. The deviation (49) takes into account the terrestrial gravitation effect only. The Earth movement relative to the vacuum field is not included in the consideration.

To take into account the influence of the Earth movement speed, it is necessary to understand, that the vacuum field deformation is made by the gravitational field, i.e. by the mass, and the mass increase with speed results in the additional speed deviation σ_w at movement

$$\sigma_w = \sigma_\varphi \sigma_v = \frac{1}{2} \frac{\varphi_n}{C_0^2} \cdot \frac{1}{2} \frac{v_0^2}{C_0^2} = \frac{1}{4} \frac{\varphi_n v_0^2}{C_0^4} \quad (50)$$

or

$$\sigma_w = \sigma_\varphi \sigma_v = \frac{1}{4} \frac{R_g v_0^2}{R_3 C_0^4} = 1,75 \cdot 10^{-16} \quad (51)$$

The equation (51) allows us to estimate the Earth movement influence on the light speed change, which is about $5 \cdot 10^{-8}$ m/s, for the vacuum field from the deviation magnitude. It is an exact estimation of the order for given parameter. This very small quantity lies beyond the sensitivity for the interference-based techniques, that allows us to reconsider the result treatment for the Michelson and Morley experiments [5].

On the other hand, as a quantized electromagnetic medium, the vacuum field is shown in the EQS theory to cannot be considered in terms of an acoustic wave measure. The spherical invariance principle establishes that the gravitational field of the Earth keeps a spherical shape independently of the movement speed. But, as a special form of static electromagnetism with the discreteness of 10^{-25} m, the gravitational field defines the light propagation speed in vacuum by the value of the gravitational potential of action (35), (36). Therefore the spherical invariance principle establishes, that in the vacuum field the light from a terrestrial source to all directions will be propagated identically, irrespective of the terrestrial source speed.

Paradoxically, but the fact is a fact, for a light source in the terrestrial conditions, independently of the Earth movement speed in the vacuum field, the gravitational field, which is a light-transmitting medium, will be observed as a motionless one. It is a fact, which was established in the Michelson and Morley experiments. The spherical invariance principle

for vacuum field can be broken only as a result of fluctuations in the quantum density of medium in vacuum. But while we do not know the required accuracy for devices in order to detect these fluctuations.

At body movement the elastic quantized (space) medium (EQS) is specified through the remarkable behavior in comparison with all known mediums. The EQS completely excludes the effects similar to «ether wind».

15. Substance and antistubstance. The EQS theory gives a clear distinction between the substance (plus - mass) and antistubstance (minus - mass). Let's rewrite the balance of gravitational potentials (35)

$$C^2 = C_0^2 \pm (-\varphi_n \gamma_n) \quad (53)$$

The balance (53) describes a minus - mass state (which is represented in the gravitational diagram of Fig. 6) in the vacuum field.

Comparing the gravitational diagrams from Fig. 5 and Fig. 6 indicates the principal distinction between the substance and antistubstance.

For the substance the gravitational border contracts the vacuum field inside the border at the cost of substance rarefying in the external region.

For the antistubstance the gravitational border constrains the vacuum field tension of the external region, preventing the field breaks. As a result, inside the gravitational border the quantum density is less than one in the external region. But such system state is unstable and characterized by the quantum density "hill" for antiparticle (Fig. 6). The most stable state of system is defined by the gravitational "well" for particle (Fig. 5). Probably it explains the substance asymmetry (expressed through the quantitative prevalence of the substance above antistubstance) for the vacuum field.

In this context, the positron is a conditional antiparticle with respect to the electron, since the positron possesses no minus-mass and is a carrier for the electrical charge of positive polarity thereby (as well as electron) deforming spherically the vacuum field.

The EQS theory uncrowns a myth on antimatter. Our Universe is uniform as the electromagnetic matter in a vacuum field form and capable to generate both particles and antiparticles (i.e. the substance and antistubstance). The matter is proved by the

absence of the antimatter (not found experimentally) in the Universe to be uniform.

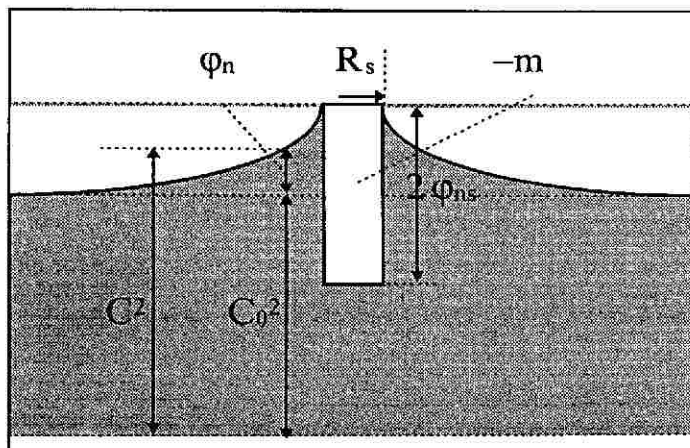
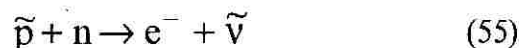


Fig. 6. Gravitational diagram of minus - mass state (distribution epure for gravitational potential at spherical deformation of vacuum field by antiparticle)

The EQS theory uncrowns also a myth that all reactions of interaction between particles and antiparticles are associated with releasing the energy corresponding to the mass defect. So, for example, two nucleons (a proton p and an antineutron \bar{n}) annihilate by being transformed in the positron e^+ and the neutrino ν (54). On the contrary, an antiproton \bar{p} interacting with a neutron n gives the electron e^- and the antineutrino $\bar{\nu}$ (55) [5]



The reactions (54) and (55) are not associated with releasing the excessive energy in an emission form. It would seem the obvious infringement in the preservation law for the energy and mass is observed. But so it would be possible to think not knowing the gravitational diagram for nucleon and antinucleon, represented in Fig. 5 and Fig. 6. At superimposing the diagrams between themselves there is their mutual compensation without wave perturbation for the vacuum field. The emission is absent. The reactions (54) and (55) are the brightest confirmation that the release of excessive energy is connected to the obvious particle mass defect, which results in wave excitation for the vacuum field. The released excessive electrical charge generates a positron (electron) in vacuum. The nucleon shells are contracted from a neutrino (antineutrino) in cluster.

16. Space-time problem. Supposing in [1], that elementary quantum of space (quanton) is a real carrier of time, the problem of time was already mentioned. In the context of a universal timer, the quanton represents an elastic volume element, the oscillation period of which T_0 is defined by the time of propagation for electromagnetic wave perturbation through the quanton in the non-deformed vacuum field

$$T_0 = \frac{L_{q0}}{C_0} = 2,5 \cdot 10^{-34} \text{ c} \quad (56)$$

In the deformed vacuum field the oscillation period changes. At spherical deformation of vacuum field inside the gravitational border the quantons are compressed thereby accelerating a course of time. In the external region the quantons are stretched and slow down a course of time. Generally the course of time is described in terms of Poisson's equation for the elastic state of vacuum field. In space the time is distributed in a continuous chronal field form. Composing the Poisson equation is resulted to replacing the gravitational potential of action in (40) by its analogue expressed through the spatial-temporary parameters of quanton

$$\varphi_a = C^2 = \left(\frac{L_q}{T} \right)^2 = \frac{L_q^2}{T^2} \quad (57)$$

$$\frac{\partial^2 \frac{L_q^2}{T^2}}{\partial x^2} + \frac{\partial^2 \frac{L_q^2}{T^2}}{\partial y^2} + \frac{\partial^2 \frac{L_q^2}{T^2}}{\partial z^2} = G \rho_m \gamma_n \quad (58)$$

The solution of the chronal Poisson equation (58) allows to find a distribution of the spatial-temporary parameter L_q/T for spherically deformed vacuum field in the whole range of speeds both in the external and internal regions of the gravitational border

$$\begin{cases} T_1 = T_0 \frac{L_{q1}}{L_{q0}} \left(1 - \frac{R_g \gamma_n}{r} \right)^{-\frac{1}{2}} \\ T_2 = T_0 \frac{L_{q2}}{L_{q0}} \left(1 + \frac{R_g \gamma_n}{r} \right)^{-\frac{1}{2}} \end{cases} \quad (59)$$

where L_{q1}/T_1 and L_{q2}/T_2 are spatial-temporary parameters in the external and internal regions of the gravitational border, m/s.

From (59) we find

$$\begin{cases} T_1 = T_0 \frac{L_{q1}}{L_{q0}} \left(1 - \frac{R_g \gamma_n}{r} \right)^{-\frac{1}{2}} \\ T_2 = T_0 \frac{L_{q2}}{L_{q0}} \left(1 + \frac{R_g \gamma_n}{r} \right)^{-\frac{1}{2}} \end{cases} \quad (60)$$

From the solution of Poisson' equation for the quantized medium distribution in deformed space [2] we find the ratios L_{q1}/L_{q0} and L_{q2}/L_{q0}

$$\begin{cases} \frac{L_{q1}}{L_{q0}} = \left(1 - \frac{R_g \gamma_n}{r} \right)^{-\frac{1}{3}} \\ \frac{L_{q2}}{L_{q0}} = \left(1 + \frac{R_g \gamma_n}{r} \right)^{-\frac{1}{3}} \end{cases} \quad (61)$$

Finally, substituting (61) in (60) we obtain the chronal field distribution in deformed vacuum field

$$\begin{cases} T_1 = T_0 \left(1 - \frac{R_g \gamma_n}{r} \right)^{-\frac{5}{6}} \\ T_2 = T_0 \left(1 + \frac{R_g \gamma_n}{r} \right)^{-\frac{5}{6}} \end{cases} \quad (62)$$

The system (62) allows to establish a course of time in space for any particle (body) moving in the whole range of speeds (up to the light ones). From (62) follows, that the time is arrested completely in the external regions on the gravitational border of static and dynamic black holes (period T tends to the infinity). Inside the black hole the time is accelerated only by a factor of 2.3, taking into account that the increase in the quantum density of medium is only a factor 2.

The course of time in space is determined first of all by the gravitational perturbation and then by the speed factor. The expression (56) specifies the shortest time in non-perturbed vacuum and, accordingly, the highest possible frequency for the electromagnetic processes

$$f_{\max} = \frac{1}{T_0} = 4 \cdot 10^{35} \text{ Hz} \quad (63)$$

The term "chronal field" was introduced by professor A. Veinik [6], who supposed (as

well as astrophysicist N. Kozyrev) that the time possesses the own carrier in a form of realistic particle chronon. However the solution for the chronal field has been found only in the EQS theory by having fixed the chronal properties to a realistic particle (quanton) joining space and time.

17. Energy hierarchy and cosmological model in the EQS theory. The modern physics accepts wrongly the energy level for vacuum as a zero one. Simultaneously, in the press there are sensational announcements concerning the works of physicist-theoreticians (including even the physicists form such orthodox scientific establishments of Russian Academy of Sciences as Landau's Institute of theoretical physics). «And the practical conclusion from the last achievements of physicists has the enormous value for us: the vacuum possesses the huge energy and it is necessary to search for ways of releasing that» [7].

With the whole responsibility I can declare, that the gentlemen theoreticians from Landau's institute have been late. The EQS theory gives not only physical models and mathematical means for calculation of the energy processes in vacuum field, but also the new ways for extraction of this enormous energy. In all known and unknown energetic cycles existing in the nature, the energy is uniform. It is the electromagnetic energy of vacuum field, irrespective of the fact, by which way the energy release is carried out. It can be

faint burning of a candle or the powerful thermonuclear explosion.

It is necessary to note that the release of excessive energy from the vacuum field is associated only with the particle mass defect. In chemical reactions the release of energy is due to the electron mass defect, in nuclear ones - to the nucleon mass defect. The EQS theory gives new ways for the energy releasing as a result of synthesis of elementary particles from the vacuum field.

The EQS theory establishes the strict energy hierarchy by subordinating all physical processes to the enormous vacuum field energy, the total balance (39) of that is determined for the first time in the theory EQS.

The EQS theory considers the Universe structure through well-known models for open and isolated cosmological systems. Of the greatest interest is the model of shell structure for the quantized Universe, which pulsation (expansion or compression in the determined limits) is associated with periodic transformation of the electromagnetic energy of system deformation to a huge gravitational wave and inversely. Since all material objects (from the elementary particles up to the cosmological systems) are an indivisible part of the vacuum field joining the whole Universe, the movement of the huge spherical wave together with the objects in direction of the shell expansion for the Universe is detected in observation as "galaxy's departing" [8].

The literature:

1. Leonov V.S. A role of superstrong interactions in synthesis of elementary particles (see the Conference Proceedings).
2. Leonov V.S. Relativizm as a special case of Newton's classical mechanics (see the Conference Proceedings).
3. Vavilov S.I. Experimental bases of the theory of a relativity. The collected works. Volume IV. — Moscow. AS USSR, 1956, — pp. 19-21.
4. Petrov A.Z. Einstein's spaces. — Moscow.: GIFML, 1961, — p. 411.
5. Okun' L.B. Weak interaction. The physical encyclopedia. Volume 4. — Moscow.: The Great Russian encyclopedia, 1994, — pp 552-556.
6. Veinik A.I. Thermodynamics of real processes — Minsk: Science and Engineering, 1991.
7. Khokhlov I. Greatest nonsense Einstein — engine of the Universe, The newspaper "Izvestiya", July 26, 2000
8. Leonov V.S. Theory of elastic quantized space, — Minsk: Bisprint, 1996, — 156 p.

4. BENEFIT AND HARM OF RELATIVISM FOR FUNDAMENTAL SCIENCE

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When we say about the truth, the latter can not be relative one. The truth can be only absolute one. Otherwise there is a serious scientific mistake or an obvious falsehood. The existing crisis in the natural science is due to an obvious overestimation for the role of the relativity theory as a fundamental science. It is known, developing the general relativity theory (GRT) Einstein defines the GRT as a theory coupling gravitation with electromagnetism. Nothing has been achieved. The GRT has not been a theory of gravitation, since it can not explain any causes of gravitational interaction. From the formal point of view the mathematics of four-dimensional space-time allow to find some relations in the range of superhigh velocities. But that is not enough. The GRT is filled with paradoxes and unsuitable already for any predictions.

No doubt, the role of Einstein is of great importance for the progress in physics. He was a pioneer and had therefore the right to mistake. The mistake was in the abandonment of any investigation of space structure, restricting himself by a space geometrization. Einstein's successors have deteriorated the situation, transforming the incomplete theory into an irrefutable dogma. As a result, the science of electromagnetic structure of space has been rejected over century, retarding the development of quantum theory. The way out the crisis is found in establishing the static electromagnetic discrete structure of quantized space.

1. Introduction. In three previous reports [1,2,3] I shown that the return from relativism to the conception of Lorentz's fixed electromagnetic ether withdraws fundamental science from the crisis state. Over the past half-centuries the science was in this state and any opposite viewpoint was ignored entirely due to the efforts of orthodox followers of relativism.

Today I repeat, the gentlemen orthodox theoreticians and relativism supporters, you have been late to distribution of new ideas in fundamental science. The uniform theory of field is created not due to the theory of relativity but contrary to it. As it usually is in the science advancement history, the answer laid not there where it has been searched. And even on the contrary, ones spoke that the direction, formulated by great Lorentz, is erroneous. Itself Lorentz regretted that he «had not manage to obtain the equations related to moving axes, in the exactly same form as the equations for fixed system» [1].

What did Lorentz lack in to bring the theory of fixed electromagnetic ether up to the logical finish? There was no infinitesimal - the elementary particle as a carrier of electromagnetic field. The century has required in order to discover intuitively the elementary quantum of space, i.e. the carrier of electromagnetic field in the theory of elastic quantized (space) medium (EQS) [1].

The quanton discovery has been held due to a property investigation of electrical and magnetic monopoles (massless elementary

charges) at their interaction inside the quanton. Naturally, at that time Lorentz (author of the electron theory) was not able to introduce the magnetic charge for space structure. The magnetism was believed by him to be a manifestation of electricity and to possess no autonomous magnetic charge. Only three decades later Dirac has introduced (let hypothetically but nevertheless) the independent magnetic charge, named as Dirac's monopole, in theoretical physics. But the experimental searches of Dirac's monopole have given no results.

Only the EQS theory has allowed us to understand that the magnetic charges exist really but only not in a free state. They are linked with electrical monopoles in the uniform electromagnetic static quantum of space (quanton). As a carrier of magnetic and electrical charges the quanton belongs to the fixed Lorentz space. The quanton possesses a concrete structure [1].

But main, the quanton is a joining particle:

- Joins electricity and magnetism in electromagnetism by being the carrier of electromagnetic field (vacuum field) and the carrier of superstrong interactions;
- Joins space and time by being the elementary quantum of space and a volume electromagnetic resonator (the time carrier);
- Joins the electromagnetic Universe by linking all objects (from elementary particles up to galaxies) together through the continuous

vacuum field;

- Joins electromagnetism and gravitation through the vacuum field by equalizing the energies for electromagnetic and gravitational fields, by defining the elementary particle structure and the limit values for mass and energy of particle;
- Joins the strong interactions through the mass defect, gravitation and electromagnetism by defining the nucleon structure;
- Joins all other fundamental interactions through superstrong interactions.

The environmental space is a specific static electromagnetic field, which structure has been discovered in the EQS theory. This fact is verified experimentally by all electromagnetic and gravitational processes. Owing to the vacuum field the mechanism of synthesis of elementary particles from vacuum and the nuclear forces nature is established.

The quanton discovery has resulted in discovery of the fifth type of superstrong fundamental interaction joining all others through the vacuum field.

Naturally, the theory EQS denies completely the relativism as a non-physical theory, which is constructed phenomenologically on completely erroneous conceptions and recognizes wrongly the space as the absolute emptiness.

2. Benefit of relativism. Doubtlessly, up to middle of the twentieth century, the scientific direction, developed by Einstein's in the relativity theory (initially special (STR) and then general (GTR)), has played the enormous positive role in basement of new physics. It is possible to list the basic scientific results associated with the relativity theory:

- Establishing the mass-energy equivalence;
- Establishing the gravitation-inertia equivalence;
- Introducing the relativistic factor in Newton's dynamic equation and taking into account the increase in mass and energy for relativistic particles;
- Introducing the space-time conception;
- Predicting a possible model for the Universe, gravitational waves and black holes.

They are the largest achievement for the relativity theory (excepting solution of a number of special problems). However, the theory of

relativity could not bring all its intentions up to the logical finish. The relativity theory was conceived initially by Einstein as the uniform field theory joining gravitation and electromagnetism. But having failed to discover the nature of gravitational interactions it has not been held even as a gravitation theory. The theory of relativity could answer no question on the phenomenon nature.

The well-known French physicist Brillouin characterized GTR: «The general theory of relativity is the brightest example of the magnificent mathematical theory constructed on sand and leading to increasing heap of mathematics in cosmology (a typical example of scientific fantasy)» [4].

3. Harm of relativism. Since the second half of XX century the theory of relativity predicted nothing. Furthermore it became a brake for science as the science implies the continuous development of knowledge. But it was not a fault of Einstein, who changes all our imaginings on space - time. The followers of the ingenious physicist have managed to transform the developing and uncompleted theory into a dogma. Any attempts to put under doubt the relativity theory basis were halted.

The basic mistake of the relativity theory consists in refusing the light-transmitting medium as the absolute space. The natural sciences were focused to a point of relativity. Everything has become relative. The absoluteness has disappeared with abolition of the absolute space.

But the true can not be relative. The true can be absolute only. Otherwise there is the deepest scientific error or a manifest lie. I think, in relation to space (recognizing it as the absolute emptiness) Einstein was mistaken sincerely. The natural development of science in spirit of classicism has been substituted by the absolutely invented concept of the relativity principle. Throughout many years the historians of science will studied the phenomenon of relativism manifestation in science.

4. Brief comparison of the relativity theory with the EQS theory. The basic reasoning for the relativism supporters is that ostensibly the relativity theory has been examined repeatedly in the experiments and the calculation conclusions agree perfectly with experiment. It is not the argument for scientist. The agreement

between a mathematical function and the experimental dependence does not mean that this function explains phenomenon nature. In this case we have only a phenomenological description for the phenomenon in terms of the mathematical formula.

If to be objective, the mathematical means of the relativity theory is not so perfect as it is represented. So, for example, the solution of the Einstein dynamical equations gives the infinitely high values of mass and energy for the relativistic particles. But it is not proved experimentally. This solution agrees with experiment only for a particular range of speeds.

All mathematical results, obtained from the relativity theory, is shown in my three previous reports to can be very easily obtained without employing the relativity theory and only by returning to a concept of the absolute fixed electromagnetic space of Lorentz in the theory EQS. Moreover there are new results, which were not dreamed by the relativity theory, including determination of the limit parameters for relativistic particle and many others. It is likely to be an indemnity to tradition - to name the particles, moving in the absolute vacuum field with a speed close to the light speed, as relativistic ones, though such movement has no relation to the relativism.

In the EQS theory «it has been possible to obtain the equations, referred to mobile axes, in the exactly same form as the equations for fixed system» [1], as it was dreamed by Lorentz. It has been achieved owing to imposing the spherical invariance principle to the vacuum field. According to the principle the mass movement in vacuum is considered as a displacement of spherical deformation of the vacuum field in the fixed absolute static electromagnetic field (space). The quantized electromagnetic medium has no analogues compared with the known continuous mediums (gas, liquid and solids) and reminds the solids with correction for own specific superelasticity.

As the scientist, who has developed the EQS theory for replacing of the relativity theory, I analyzed the relativism phenomenon (to be false in essence), which has played the substantial role in physics development. The relativism phenomenon is in a partial coincidence of the equations of gravitational potential balance in vacuum field for STR and EQS theories, although Einstein spoke never itself on any balance of gravitational potentials

in vacuum field. Einstein spoke about the squared light speed, thereby not guessing that he considered the problem of gravitational parameters of vacuum by specifying the gravitational potential of vacuum field.

In order to describe mathematically the vacuum field, it is shown in the EQS theory to should construct the balance of gravitational potentials (34) in [3]

$$C_0^2 = C^2 + \varphi_n \gamma_n \quad (1)$$

where C_0^2 and C^2 are gravitational potentials for vacuum field, accordingly non-perturbed and perturbed by deformation, m^2/s^2 ;

$\varphi_n \gamma_n$ is a gravitational potential of perturbation represented as the product of Newton's potential φ_n and the normalized relativistic factor γ_n .

The balance of gravitational potentials (1) is the basic equation describing state of deformed vacuum field. This is an exact spatial equation obtained as a result of solving Poisson's equation for elastic quantized (space) medium (EQS). The balance of gravitational potentials takes into account deformation perturbation of a mass moving in vacuum with any speed up to the light one. Naturally, the light speed for non-deformed (C_0) and deformed (C) vacuum is found from (1) as a limit quantity.

In the relativity theory the gravitational potential of perturbation $\varphi_n \gamma_n$ is replaced by the squared speed of body (particle) movement v^2 [2]

$$C_0^2 = C^2 + v^2 \quad (2)$$

thereby defining the four-dimensional interval

$$C^2 = C_0^2 - v^2 \quad (3)$$

or

$$\begin{aligned} C^2 dt^2 &= C_0^2 dt^2 - v^2 dt^2 = \\ &= C_0^2 dt^2 - (dx^2 + dy^2 + dz^2) \end{aligned} \quad (4)$$

The expression (2) is a notation for the magnitude of complex-valued speed of body in vacuum field [2]. It is also a representation form for Lorentz's transformations. But the four-dimensional interval (4) represents only the magnitude of complex-valued speed in vacuum field and can not be the basic spatial equation as it is supposed in the relativity theory.

Yes, it is possible to contend that, analyzing the four-dimensional interval (4), Einstein was very close to success in his space

description. But the four-dimensional interval (4) is shown in the EQS theory to be a quite rough description of vacuum field taking into account no vacuum field perturbation by the potential $\varphi_n \gamma_n$ (1).

All spatial equations in the relativity theory are shown from the comprehensive analysis to be approximated equations. It leads to the roughest calculation errors resulting in the infinitely high values for mass and energy. Therefore the colossal complication of mathematical means has been required in GTR. Nevertheless this complication has not solved the problems of vacuum space description both for electromagnetic and for gravitational fields.

It would be possible to carry out more detailed comparative analysis for the relativity theory and the theory EQS. But there is no necessity to do it since such analysis is presented in [1,2,3]. It is important to pay attention to the formula for the basic equation (1), describing state of vacuum field in the EQS theory, and the approximated analogue, represented in the four-dimensional interval form as a magnitude of the complex-valued speed (2).

It is necessary to pay attention to treatment of the mass-energy equivalence principle. The rest energy of particle is specified as the product of the squared light speed and mass in STR or as the product of the gravitational potential for vacuum field by the gravitational charge (mass) in the theory EQS. We obtain the same numerical results but the physical sense of phenomenon is completely different.

Doubtlessly, in these four brief reports I could not cover all aspects for the theory EQS, including new approaches to quantum electrodynamics and to the problem of practical use of vacuum field energy in the power industry (i.e. in new power cycles based on elementary particle synthesis in vacuum field). After publishing the third part of the theory EQS [5] it will be possible to familiarize with new approaches to solution of the mentioned problems and many other questions.

5. Alternative to the Michelson and Morley experiments. When it comes to the experimental verification of the EQS theory, the answer to such question will be greatly time consuming since the theory EQS allows us to explain practically any physical phenomenon investigated in the nature including the purely

electromagnetic processes and the elementary particle synthesis in vacuum.

On the other hand, the basic experiments, confirming ostensibly the relativity theory correctness, are the experiments of Michelson and Morley on ether wind detection. The ether wind abstraction is shown in the theory EQS to be unacceptable for the vacuum field concept. The vacuum field follows the spherical invariance principle, which is validated experimentally by the experiments of Michelson and Morley [3].

Naturally, it was necessary to find a well-known experimental fact denying the relativity principle and proving evidently the interaction of body with the vacuum field as an absolute medium. These experimental facts are the gyroscopic effects based on the laws of rotation inertia.

The inertia is supposed in classical mechanics to be own property of body and the causes of the inertia as a phenomenon are not considered. The theory EQS establishes the unity of vacuum field and body, which mass is resulted from spherical deformation of vacuum by the elementary particles included in the body structure. According to the field superposition principle the sum of vacuum field deformations for all particles determines the body mass. The gravitation-inertia equivalence principle establishes that the cause of inertia is also the vacuum field deformation both spherical and gradient (in a certain direction inside the gravitational border) [1,2].

Fig. 1 represents the diagram for an experiment demonstrating the indivisible coupling between rotating body and vacuum field on example of precession suspension of a gyromotor in space.

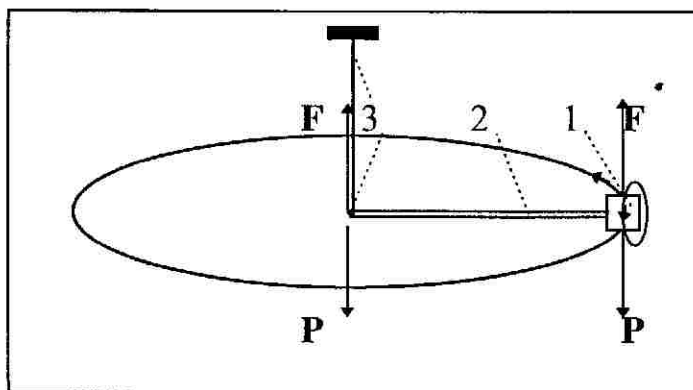


Fig. 1. Experiment on precession suspension of gyromotor in vacuum field.
1 — gyromotor, 2 — lengthened shaft, 3 — plumb line.

The gyromotor 1 is an electric motor with a flywheel rotating up to the frequency of 20000 rev/min. The gyromotor is fixed to a rigid lengthened shaft 2, suspended on a plumb line 3 by the opposite tip. This system possesses a remarkable property. Due to gyromotor flywheel rotation, the installed system precesses along a circle and keeps the gyromotor in suspended state. Despite of the gravity P it is an effect of supportless suspension of the gyromotor in space.

It is possible to treat this experiment as a gyroscopic moment effect on the shaft 2. As an effect result the force F arises. But it only a facile manifestation for the gyroscopic moment. We are interested in the causes of its occurrence. The causes are in the flywheel inertia, which is resulted from vacuum field deformation at precession. Finally, the unbalanced gyroscopic moment and the hoisting force F are formed. If to remove the precession, the force F disappears. This effect is resulted from the complex processes associated with vacuum field deformation.

If to distract attention from explaining the effect causes and to construct the balance equation for the forces fig. 1 according to the theoretical mechanics rules, we obtain the hoisting force F , counterbalanced by the gravitational force P , and the force system translation to the suspension point. Such force system is possible only if the force F is an external force, arisen as a result of the interaction of system with vacuum field. To be more specific, this experiment specifies the unity of mass and vacuum field.

It is necessary to note, that the force F direction coincides with the direction of force influencing on a rotating cylinder in high-speed liquid (gas) flow in Magnus's effect. It points that the vacuum field represents a continuous medium, but distinguished from all known mediums. The vacuum field tries to be always in equilibrium and responds to the external perturbation (inertial one for our case) [6].

It is necessary also to note, the doctor Neganov (Dubna), having investigated gyroscopic effects (including Thomas's rotation effect), supposes that the manifestation of such effects is obliged to existence of the absolute space [7]. The experimental investigations of Smirnov (Dubna) have allowed to offer the hypothesis on existence of a static electromagnetic field [8], which is the

cornerstone in the theory EQS as a static electromagnetic vacuum field. However the balance violation for static electromagnetic field is manifested much more effectively for all electromagnetic processes occurring in vacuum.

Doubtlessly, a wealth of scientists (for example [9-14] and others) is engaged in developing of the absolute space model. However, the structure of electromagnetic vacuum field is considered only in the theory EQS.

5. Forecast to development of fundamental science in the nearest prospects. The theory EQS allows to predict not only the fundamental science development but also the perspective development of essentially new technologies in the power industry, space transport, communication, element transmutation, biotechnology, genetics, medicine and other branches.

First of all, I would like to comment what the physicist-theoreticians, unfamiliar with the theory EQS, think concerning the development of fundamental science. In particular, the known American expert in the superstrings theory M.Cacu comments the development of gravitation theory in the following context: «Newton recognize the gravitation as a force acting immediately through distance. Einstein has assumed, that the gravitation is caused by the curvature of space-time. The primitive joining the general theory of relativity and quantum mechanics gives the diverging theory, so-called quantum gravitation, in which it is supposed that the gravitation is created through exchange by special «particles» - gravitons. In the theory of strings it is supposed, that the gravitation is due to exchange by closed strings» [15].

Clearly, M.Cacu criticizes Newton's theory of gravitation, the gravitation theory of Einstein, the quantum gravitation and sees the exit in development of the superstrings theory. The theory of superstrings is only a mathematical theory joining the quantum gravitation with the gauge theory of elementary particles and having no physical model. Such criticism from the known expert in this area indicates serious problems for modern state of the gravitation theory.

My personal attitude to any theory, having no physical model, is extremely negative, since such theory can restrict the fantasy within

the rigid frameworks. It is quite another matter, to find the only possible and correct model is not easy. It is the chain of completely casual events and coincidences. For all mankind it is inessential to know who has made the scientific discovery. It is important only for experts.

The EQS theory predicts the vigorous development for quantum theory. The uniform theory of field is created by introducing a joining particle (the quantum of space, i. e. the quanton) in theoretical physics. The discovery of the spatial quantum alongside with the known radiation quantum allows to recreate the absolutely different picture of physical world.

The wave equation of Schrodinger, the wave function and the wave mechanics have been possible owing to the elastic properties for

quantized medium as an electromagnetic vacuum field. Following to the principle of corpuscle-wave dualism the elementary particles have become the main component for the vacuum field. The EQS theory translates a plane of elementary particle study on the area of their individual quantum properties and statistics.

Doubtlessly, the theory EQS develops essentially other quantum theory of gravitation for elementary particles, quantum mechanics and electrodynamics.

But main, the EQS theory gives rise to the development of essentially new power technologies, based on the elementary particles synthesis in vacuum field. In the near future these technologies will be a serious alternative to uranium-fuel-based ones [16-18].

The literature:

1. Leonov V.S. A role of superstrong interactions at synthesis of elementary particles, (see the Conference Proceedings).
2. Leonov V.S. Relativism as a special case of Newton's classical mechanics, (see the Conference Proceedings).
3. Leonov V.S. Spherical invariance at the development of absolute cosmological model, (see the Conference Proceedings).
4. Brillouin L. New sight on the theory of relativity, - Moscow: Mir, 1972, - p. 28.
5. Leonov V.S. The theory of elastic quantized medium, Part 3, Synergetics of uniform vacuum field. Manuscript, is prepared to edition, 2000, - 510 p.
6. Leonov V.S. Inverse gyroscopic effect in the theory EQS, Proceedings of the Second Belarus Congress on theoretical and applied mechanics «Mechanics - 99», - Minsk, Belarus state polytechnical academy, 1999, - p. 8.
7. Neganov B.S. On existence in Lorentz's mechanics of absolute reference system, - Dubna: United institute of nuclear researches, 1998, preprint P2-98-217.
8. Smirnov V.I. Experimental verification of hypothesis on existence of static electromagnetic field, - Dubna: United institute of nuclear researches, 1999, preprint P13-99-7.
9. Lebedev T.A. On some debatable questions of modern physics, Parts 1, 2, 3, 4. - Leningrad: Leningrad polytechnical institute, 1954-57.
10. Maneev A.K. To criticism of a substantiation of the theory of a relativity. - Minsk: Изд-ин an Academy of sciences BCCP, 1960.
11. Zakazchikov A.I. Contradictoriness of Lorentz transformations. - Physical thought of Russia, 1998, № 1, - p. 64.
12. Streltsov V.N. Gravitational potential can not be tensor, Reports of united institute of nuclear researches, - Dubna, 1996, Д2-96-66.
13. Belinsky B.A. Physics of elementary field, - Moscow: Agroconsult, 1997.
14. Ivanchenko G.E. Physics of absolute space and absolute time, - Moscow: Aslan, 1995.
15. Cacu M. Introduction in the theory of superstrings, - Moscow: Mir, 1999, p. 25.
16. Leonov V.S. Forecast of the power industry development over 2000...2010, Proceedings of republican scientific - practical conference "Scientific maintenance of steady development of republic Belarus", - Minsk: Rotaprint CNIIMESK, 1998, - p. 55-60.
17. Leonov V.S. Perspective ecologically clean technologies for production and transformation of energy. Proceedings of the First international congress «Demographic problems of Belarus» on March 17-20, 1999. Minsk, - p. 90-91.
18. Leonov V.S. Uniform power space as a potential source of ecologically clean energy, In: " Power problems and ways of their solution for population of Belarus and world countries (Proceedings of congress)" - Minsk: 1999, - p. 19-22.

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