STRUCTURE OF VACUUM AND UNITY OF INTERACTIONS

A.V. Rykov

Russia, Moscow, Institute of Physics of Earth, Russian Academy of Sciences

Photon Interaction with vacuum and its power parities have allowed to find out structure of vacuum in space, nuclear and particle variants. The structure of vacuum results in detection of the superiority of the electron charge above the positron charge on amount of $1{,}56980711 \cdot 10^{-40}$ Q. The surplus of a charge of vacuum generates the phenomena of gravitation and antigravitation in the universe, stability of dipoles existence in vacuum and in electronic clouds above nucleuses. In a basis of the universe the uniform law Coulomb interactions lays determining gravitation, electromagnetism, nuclear forces.

There are distinctions between the physical laws and scientific research technologies. For example, it is possible to consider the law of gravitation of Newton just as the law, and the Kepler laws and also other laws of Newton can be related to technological receptions of research of Solar system and movement of masses. Some accepted hypotheses at a level of axioms are stated.

1. Axiom first. In the macro and in micro worlds the law of gravitation of Newton and law of Coulomb of interaction of charges are lawful.
2. Axiom second. In the macro and in micro worlds an electrical and magnetic constant of vacuum is invariable, and gravitational constant depends on medium of space, nucleus.

The axioms are not obvious to traditional physics. The task of the paper, in particular, is to find out them correct. At the decision of a task the disputable results will be received are unordinary and probably, which are offered for the beforehand unbiased reader.

For convenience electrical and magnetic permeability of vacuum are represented in a normal view, i.e. their return sizes are accepted:

$\xi = \frac{1}{\varepsilon} = 8.987551 \cdot 10^{9} [q^{-2} м^{3} kg\, s^{-2}]$ - Electrical vacuum constant equal to return size of permittivity,

$\nu = \frac{1}{\mu} = 1{,}00000031 \cdot 10^{7} [q^{2} kg^{-1} м^{-1}]$ - Magnetic vacuum constant equal to return size of magnetic permeability.

Thus the laws of Newton and Coulomb receive an identical view. For research of structure of vacuum the well known experimental data on interaction of vacuum with photon are used.

Space vacuum

Space vacuum as we shall understand accepted in physics certain “a photon field ” as a source virtual photons as exchange particles at electromagnetic interactions. Photon , having frequency ν, deforms its structure. Being in vacuum with the size between its elements r, photon makes deformation dr. Thus the energy of deformation will be $e_o E dr$, where e_o - electron or positron charge, E - intensity of an electrical field of structure.

The photon energy is equal to energy of deformation:

$$h\nu = e_o E dr \qquad (1)$$

The deformation depends on time. Photon is an electromagnetic phenomenon with amplitude $r\sin(2\pi\nu t)$:

$$dr = d[r\sin(2\pi\nu t)] = 2\pi\nu r dt\cos(2\pi\nu t) \qquad (2)$$

Let's determine intensity of an electrical field, where N - certain factor of proportionality:

$$E = N\xi\frac{e_o}{r^2} \qquad (3)$$

Let's substitute the received expressions (amplitude from 2 and intensity from 3 in 1):

$$h = 2\pi N e_o^2\xi\frac{1}{r/dt} \qquad (4)$$

It is possible to assume $r/dt = c = \sqrt{\nu\xi}$ - speed of light.

Let's note, that this assumption seems natural, but not obvious. Let's determine unknown number:

$$N = \frac{h}{2\pi e_o^2 r_q} = 137{,}0360 = \alpha^{-1}, \qquad (5)$$

where $r_q = \sqrt{\xi/\nu}$. In result we have number of return size of constant thin structure. Have received from (5) the known formula for The Plank constant:

$$h = 2\pi e_o^2 r_q \alpha^{-1} \qquad (6)$$

In (2) and (4) the mathematical concept of differential is incorrectly used. The basis - mathematics not is physics, the physics not is mathematics. In this case it is the simple example of a proper correlation of mathematics and physics.

The done operation and its result - first certificate about not of hopelessness of the put task. The number N is connected to an elementary charge under the formula (3) and hints at possible interpretation as the complete number of elementary charges in some cluster of vacuum similar with pi-meson and with which photon co-operates. The following stage will be the reference to “photoeffect” for vacuum. It is known, that photon with energy

$w \geq 1\,MeV = 1{,}6 \cdot 10^{-13}\,Dj$ turns to a pair electron and positron. From classical positions, probably, it is necessary to tell, that photon "beats out" from structure of vacuum the specified pair of particles (photoeffect in the pure sense). It not far from the fact, known in physics, of realisation under photon with the necessary frequency (energy) influence on pair from virtual electron and positron particles. Let's choose size of "red border" for photon frequency $\nu_{rb} \geq \frac{w}{h} = 2{,}4891 \cdot 10^{20}\,Hz$. Its exact value is determined from the formula (10), when at conclusions there will be a value of thin structure constant. For definition r we shall take advantage of the equation of energy under the Coulomb law and photon energy $h\nu$:

$$w = \xi \frac{e_o^2}{r} = 2\pi\alpha^{-1} e_o^2 r_q \nu_{rb} = 1{,}6493 \cdot 10^{-13}\,DJ \tag{7}$$

From (7) we find the value of a structural element:

$$r = \frac{\alpha^{-1}\xi}{2\pi r_q \nu_{rb}} = 1{,}398826 \cdot 10^{-15}\,м \tag{8}$$

We have distance between virtual electron and positron charges forming a tied charge or dipole, which is less in 2,014504 times than classical electron radius. Limiting dipole deformation, which is "red" border of its "destruction" at photoeffect is determined from:

$$dr_{rb} = \frac{h\nu_{rb} r^2 \alpha}{e_o^2 \xi} = 1{,}020772 \cdot 10^{-17}\,м, \tag{9}$$

The dipole deformation is less than the given value should have electroelastic character and at the greater value of deformation there would be a dipole destruction, the birth of pair of free electron and positron with zero move speed at exact performance of equality (7). The little bit large photon energy (its frequency) for giving non zero move speed of pair of particles is required. A remarkable consequence from the formula (9) -

$$dr_{rb} = 1{,}020772 \cdot 10^{-17} = \alpha \cdot r\,. \tag{10}$$

Here extreme durability of vacuum lays, whence follows, which is similar to durability of an ether! The dipole destruction comes only at 1/137 parts of deformation from its whole value! In a nature the so small difference of deformation from an integer for achievement of strength is not known. The photoeffect for platinum gives value of deformation $dr_{Pt} = 6{,}2 \cdot 10^{-23}\,м$. By other words, the vacuum is "stronger" than platinum almost on 6 orders.

The exact value of α has helped to return (see above) and to specify value of photon frequency as $2{,}4891 \cdot 10^{20}\,Hz$. Under the given formula the connection of strength through thin structure constant and distance in dipole is carried out. Let's determine deformation from a electron taking place in its media through the equation of energy of a electron field and energy of deformation (axiom 1):

$$\xi \frac{e_o^2}{r_e} = \xi e_o^2 \alpha^{-1} \frac{dr}{r^2}, \quad dr = \alpha \frac{r^2}{r_e} = 5{,}067116 \cdot 10^{-18}\,м \qquad (11)$$

The deformation from electron as well as a ratio of classical radius and dipole size is less in 2,0145 times. As a result of deformation at electron presence or other particle the photon energy can decrease, as it is observed at a vacuum photoeffect - occurrence, for example, two of electrons and one of positron.

As in vacuum there is certain dipole, it will be natural to speak about its polarisation:

$$\sigma_{dr} = \alpha^{-2} \frac{e_o}{4\pi r^4} (dr)^2 = S(dr)^2 \quad where$$
$$S = 6{,}253387 \cdot 10^{43} [q\,м^{-4}] \qquad (12)$$

So, the basic elements of structure of space vacuum are established. What they give?

1. The interaction between photon and vacuum in a most general view results in the mechanism of propagation of electromagnetic disturbances in vacuum structure. The electromagnetic wave begins with a cross movement of the tied charges of vacuum under action of “source” and there is an involving in this movement of the neighbour charge on a direction of distribution, but last one is inverted to the initiator by a charge of an opposite sign according to the Coulomb law. The Maxwell currents directed on a movement of charges to one party, but with opposite sign will be formed. This implies, that between currents in a perpendicular direction there is a magnetic intensity as the sum two and more magnetic strings. The arisen magnetic field carries out besides mutual “transformation” of electrical and magnetic energy a role of damper of propagation, limiting speed of light. Thus, the tied charges - dipoles - are the retransmitters of an electromagnetic wave. This extremely important understanding, because a light reaching the observer not is initial phenomenon or photon in the source, and repeatedly relayed signal.
2. It is natural to assume, that the longitudinal dipole polarisation of space vacuum concerns to the phenomena of gravitation. The gravitation is explained by electrostatic “field”, which is transferred in vacuum as a longitudinal signal. At longitudinal action of the Coulomb law between the tied charges there is a longitudinal movement of front of polarisation, which is not accompanied by occurrence of a magnetic field between charges, parallel

. moving in one direction, of an identical sign. The magnetic intensity should in this case cover moving charges as a current in a conductor. As electrostatic "field" or gravitational "field" act as central and frequently in general spherical, the total magnetic intensity of Maxwell currents appears to be for gravitational object or charged by a static electricity completely compensated, and completely is absent a damp action. It means really huge speed (if not instant!) propagation of a longitudinal wave in vacuum. In a case of almost instant speed of action of gravitation our Universe appears to be by uniform system, in which its any part "realises" itself in complete unity with the whole. Only so it is capable to exist and to develop. Cosmology cannot manage to be without "instant" transfer of gravitation.

Let's address to gravitational dipole polarisation of vacuum. What the reader could look after a string of a conclusion, we shall state a hypothesis of equivalence of the laws of Newton and Coulomb, that is we shall proceed to the Uniform Law of the Universe through the formula of dependence gravitational Colombian charge from mass of any body (formula of Newton and Coulomb). The gravitational electrical charge of any mass pays off under the formula:

$$Q = \rho M \text{ , where } \rho = \sqrt{\frac{\gamma}{\xi}} = 8{,}61640 \cdot 10^{-11} [q\, kg^{-1}] \qquad (13)$$

The value of factor can be determined on the basis of microparameters under the formula:

$$\rho = e_o \sqrt{\frac{2\pi\gamma}{ch\alpha}} = 8{,}616400 \cdot 10^{-11} [q / kg], \qquad (14)$$

where $e_o = 1{,}60217733 \cdot 10^{-19}$ [q] - electron charge,

$\gamma = 6{,}67259 \cdot 10^{-11} [м^3 kg^{-1} c^{-2}]$ - gravitational constant,

$c = 2{,}99792458 \cdot 10^{8}$ - speed of light,

$h = 6{,}6260755 \cdot 10^{-34}$ - Plank constant.

Continuing the classical approach to structure, we shall notice, that the force of elastic electrical deformation will be determined from

$$f = b dr_{rb} = \xi \frac{e_0^2}{r^2}, \quad b = \xi \frac{e_0^2}{dr_{rb} r^2} = 1{,}155065 \cdot 10^{19} \text{ [kg/s}^2\text{]}. \qquad (15)$$

Polarisation

$$\sigma_{pol} = Q / 4\pi R^2 [q\, m^{-2}], \qquad (16)$$

expressed through microparameters:

$$\sigma_{dr} = \alpha^{-2} \frac{e_o}{4\pi r^4} (dr)^2 = S(dr)^2 \text{ where } S = 6{,}253387 \cdot 10^{43} [q_M^{-4}] \quad (17)$$

And in a result we have the view of the formulas received above:

$$g = 4\pi\sqrt{\gamma\xi} S\, dr_g^2 \ м/s^2. \quad (18)$$

The longitudinal dipole deformation of vacuum from gravitating object determines acceleration of force of mass and on the contrary, the acceleration of force of mass determines deformation of structure of vacuum. However mechanism of gravitation remains while obscure. We have limiting deformation (10). Let's calculate for its the maximal acceleration:

$$g_{\max} = 6{,}3409 \cdot 10^{10} \ м/s^2. \quad (19)$$

The force of electroelastic deformation from (15) will be determined by the maximal acceleration and unknown mass m_x:

$$b dr_{rb} = b\sqrt{\frac{g_{\max}}{4\pi\sqrt{\gamma\xi}\, S}} = g_{\max} m_x. \quad (20)$$

From the equation we find unknown mass and it is found out, that the $m_x = \sqrt{\alpha}\, m_{pl}$, where m_{pl} - Plank mass. Unknown mass is equal to 1,8594446*10^{-9} kg. It appears, that the $e_o = \rho m_x = 1{,}602172 \cdot 10^{-19} [q]$ - where it is enough precisely value of the electron charge.

Finishing a theme of space vacuum, we shall get resulting formula for estimation of speed of propagation of light depending on dipole deformation $c_{dr} = c\sqrt{1 - \frac{1}{\alpha}\frac{dr_g}{r}}$. For example, the corner of refraction of light which is taking place concerning to a surface the Sun will be $\varphi = arcSin(1 - \sqrt{1 - \frac{1}{\alpha}\frac{dr_{sg}}{r}}) = 1{,}9094''$, that practically is confirmed by experience. Thus it is necessary to remember, that the beam passes above a surface of the Sun and the situation other concerns its theoretically, in a reality: such is not known, what is a “surface” of the Sun. For limiting deformation, when $dr_g = \alpha \cdot r$, the speed of light is equal to zero. This property has “mass of a black hole ”, and the limiting deformation will correspond to “horizon of events ”. The excess of limiting deformation will result in intensive birth of pairs electron - positron, on accepted terminology - to evaporation of a black hole.

Besides the red displacement will be observed at radiation from a source on heavy object known as “delay time” in the Einstein theories. The red displacement arises from transition of a beam of light from vacuum with low speed into space with usual value of speed under the formula $\Delta\lambda = \lambda_c - \lambda_{cg} = \frac{1}{\nu}(c - c_g)$, where $c_g = c_{dr}$.

Nuclear vacuum

The methodology, appears to be true at research of structure of space vacuum, is applicable to nuclear vacuum. The nuclear vacuum will mean medium with virtual pi-mesons, participating as exchange particles at nuclear interactions. Using the already tested tool, we shall determine classical pion radius. Energy $w_\pi = 2m_\pi c^2 = 273{,}2 \cdot m_e c^2 = 2{,}2367 \cdot 10^{-11} DJ$ and radius dipole according to an axiom 2 $r_{c\pi} = \xi \frac{e_o^2}{w_\pi} = 1{,}0315 \cdot 10^{-17}$ *м*. Classical charged pion radius is a little bit more than border strength of space vacuum. Ukava radius is equal $R_u = \frac{h}{2\pi m_\pi c} = 1{,}4135 \cdot 10^{-15}$ *м*, at nuclear distances it is a lot of less than this radius nuclear forces are displayed to the greatest degree.

$$f_k = \xi \frac{e_o^2}{(-r_p + r)^2}, \qquad f_u = \xi \frac{e_o^2}{(-r_p + r)^2} e^{-\frac{r}{R_u}}. \qquad (21)$$

Radius of a proton is introduced into the formulas, as on smaller distances nucleon cannot and should not approach. For «penetrations» in meson medium of vacuum we shall take advantage of the phenomenon of a nuclear photoeffect. It is known, that excitation of a nucleus and subsequent emission from it a meson needs photon energy 140 MeV or $140*1{,}6*10^{-13}$ *DJ*. If to assume, as well as in a case of photon field, that the meson field is formed by the tied charges (dipoles) from pion$^+$ and pion$^-$, the photon energy should surpass $280*1{,}6*10^{-13}$ *DJ*. The energy of rest for one meson cluster with charges (+) and (–) will be $w_{ph} = 2 \cdot 274{,}072 \cdot m_e c^2 = 4{,}487716 \cdot 10^{-11}$ *DJ*. It is necessary to take into account defect of mass in meson cluster, i.e. its rest energy will be $w_\pi = 2 \cdot 273{,}2 \cdot m_e c^2 = 4{,}473438 \cdot 10^{-11}$ *DJ*. We find that $\Delta w_{ph} = w_{ph} - w_\pi = 1{,}427800 \cdot 10^{-13}$ *DJ*. By analogy of the formula (7) we shall determine arm of meson dipole:

$$r_\pi = \xi \frac{e_o^2}{w_{ph}} = 5{,}140876 \cdot 10^{-18}\ м. \qquad (22)$$

Arm is less than classical pion radius in 2,0065 times. Let's find an alpha of the meson ether:

$$\alpha_\pi = \frac{\Delta w_{ph}}{w_{ph}} = 0{,}00318157 \qquad (23)$$

And limiting deformation

$$dr_\pi = \alpha_\pi \cdot r_\pi = 1{,}635613 \cdot 10^{-20}\ м. \qquad (24)$$

We carry out the control of the received results - $\Delta w_\pi = w_\pi - \xi \frac{e_o^2}{r_\pi + dr_\pi} = 1{,}423237 \cdot 10^{-13}$ *DJ*. It is possible to see a divergence with the previous result only in the fourth mark, i.e., that the counts are carried correctly. Thus, it is enough in a nucleus to make by any way deformation of the tied charges more, than it is determined in (24), and that way from a nucleus will be get as a minimum as one pion. Let's find factor of meson dipole elasticity by that manner , as well as in case of space dipole (see formula 15),

$$f = b_\pi dr_\pi = \xi \frac{e_0^2}{r_\pi^2}, \quad b_\pi = \xi \frac{e_0^2}{dr_\pi r_\pi^2} = 5{,}211357 \cdot 10^{26}\ kg/s^2 \qquad (25)$$

Elasticity of meson vacuum on 7 orders above the space vacuum. It is necessary to apply energy $w_{\pi d} = br_\pi dr_\pi = 4{,}3820 \cdot 10^{-11}$ *DJ* to break off meson dipole and to receive two pions. It is almost in 300 times exceeds energy of ties of a photon field. As we do not find out a difference between Colombian and specific nuclear forces, the following logic step is possible. The formula (25) gives an opportunity to enter concept of Newton interaction into a nucleus (axiom by 1) and such opportunity it is necessary to take advantage. According to this "an arbitrariness ", the nuclear vacuum should have a constant of gravitation, distinct from constants of gravitation of space vacuum. Let's find a meson constant of gravitation:

$$f = b_\pi dr_\pi = \gamma_\pi \frac{m_p^2}{r_\pi^2} \qquad (26)$$

$$\gamma_\pi = \frac{b_\pi dr_\pi r_\pi^2}{m_p^2} = 8{,}052106 \cdot 10^{25} [м^3 kg^{-1} s^{-2}]$$

This value of a meson constant of gravitation equalises Colombian and Newtonian ("nuclear") forces in a nucleus.

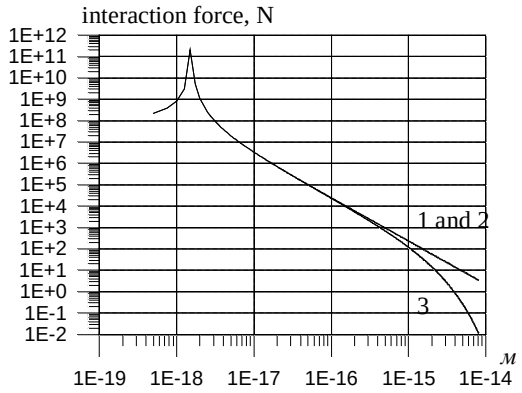

Fig.1. 1 and 2 - Colombian and Newtonian force, 3 - count of Ukava potential.

$$f_N = \gamma_\pi \frac{m_p \cdot m_p}{(-r_p + r)^2}, \qquad f_u = \xi \frac{e_o^2}{(-r_p + r)^2} e^{-\frac{r}{R_u}} \qquad (27)$$

On fig.1 the diagrams Colombian and gravitational forces between protons are shown. Let's remind, that $r_p = 1{,}5347 \cdot 10^{-18}$ *м* - classical radius of a proton.

Shortdistans of “nuclear” forces are completely explained by meson vacuum spatially limited to the sizes of a nucleus. Thus, photon vacuum and meson vacuum unite in the first case by usual gravitation and electromagnetism, in the second case by the nuclear gravitation and nuclear electromagnetism. The electromagnetism unites, probably, all interactions in a nature. A question on weak interaction here is not considered. Probably, it can be solved on the basis of structure of meson vacuum. It is possible to assume, that the weak interactions are displayed in spontaneous destruction of meson clusters on positrons, neutrino, radiation etc. On fig.1 it is possible to note one more fact, which should be related to amusing concurrence. The left slope of the diagram concerns to force of interaction proportional to a square of distance, instead of to its return size! At increase of distance between hypothetical quarks, taking place inside nuclear - distance less than 10^{-18} *м*, the force of “tension” hypothetical gluons is increased with increase of distance. As the left slope of the diagram demonstrates. The force in peak gets infinite grate value, that guarantees of gluon force on durability and consequently “free” quarks are impossible.

On the basis of axioms we shall determine the electron classical radius, by taking advantage of the equation of electron energy:

$U = \xi \frac{e_0^2}{r_x} = m_e c^2 = 8{,}18711 \cdot 10^{-14}\, dj$, where e_o and m_e - electron charge and mass. From the equation is determined, that $r_x = 2.81794092 \cdot 10^{-15}$ *м* - there is the electron classical radius. Let's take advantage of results of a nuclear photoeffect in vacuum. Energy scale of quantum $w_{hvp} = 4 m_p c^2 = 6{,}013007 \cdot 10^{-10}\, dj$ (m_p - mass of a proton), necessary for reception of a proton and antiproton from vacuum. Dipole distance of the tied charge of nuclear vacuum $r_{pp} = \xi \frac{e_o^2}{w_{hvp}} = 3{,}836819 \cdot 10^{-19}$ *м*. Electrical elasticity nuclear dipole $b_p = \frac{w_{hvp}}{r_{pp}^2} = 4{,}084631 \cdot 10^{27}$ kg/s^2. Strength of a proton or dipole deformation $dr_{pp} = \alpha_p r_{pp} = 3{,}836819 \cdot 10^{-19}$ *м*, where $\alpha_p = 1$ - thin structure constant of nuclear vacuum media. Actually it means impossibility of deformation of a proton more than its radius, at which excess the proton collapses. Let's estimate nuclear gravitational constant, by taking advantage the equation for elastic force and force under the formula of Newton:

$$f = b_p dr_{pp} = \gamma_p \frac{m_p^2}{r_{pp}^2}$$
$$\gamma_p = \frac{b_p dr_{pp} r_{pp}^2}{m_p^2} = 8{,}2467 \cdot 10^{25} [м^3 kg^{-1} s^{-2}] \qquad (28)$$

What the nuclear constant of gravitation means? Neither more, nor less as a condition of stability of a proton - powerful Colombian forces of repulsion away of a charge of a proton are equalised by Newtonian force of an attraction, i.e.

$$f = \gamma_p \frac{m_p^2}{r_{pp}^2} = 1{,}5672 \cdot 10^9 н = \xi \frac{e_o^2}{r_{pp}^2}.$$

Let's make the equation of static forces of Newton and Coulomb for electron and we shall determine radius of electron mass:

$$f = \gamma_p \frac{m_e^2}{r_{ex}^2} = 29{,}0535_H = \xi \frac{e_o^2}{r_e^2}$$
$$r_{ex} = \sqrt{\gamma_p \frac{m_e^2}{29{,}0535}} = 1{,}534722 \cdot 10^{-18}\,м \qquad (29)$$

Thus electron represents two-layer structure - nucleus electron mass has radius 1,534722*10^{-18} *м*, the charged surface has classical radius 2,81794092*10^{-15} *м*. Dividing classical radius on radius of electron mass is received: the relation of classical radius and mass electron radius is equal **1836,125**. **That is exact the mass number of a proton. The electron structure (positron structure) contains the information on mass number of a proton.**

Unsolved problem?

All attempts of an estimation of volumetric density of vacuum have appeared be unsuccessful. The available estimated data on average density of the universe 1,608*10^{-26} kg/*м*^{3} result in unreal density of space vacuum formed by electron + positron dipoles. Taking into account this circumstance, and also obvious contradiction arising at electron and positron annihilation with a condition by preservation of their masses in dipole of the ether, we shall state a hypothesis, that mass electron and positron annihilation is really occurred with allocation of the appropriate energy, but their charges forming the dipoles of tied charges of an ether are kept probably, as structure of elementary particles is shown above which is formed separate from each other by charging surfaces (plasmas) and mass nucleuses. Mass m_x gives an occasion to determine the reason for gravity. Let's calculate how many electron and positron pairs are in this mass $n_{-+} = \frac{m_x}{2m_e} = 1{,}0206205081 \cdot 10^{21}$ *pieces*. It is easy to know the value of a charge, on which the electron charge surpasses a positron charge $\Delta e_o = \frac{e_o}{n_{-+}} = 1{,}56980711 \cdot 10^{-40}$ *q*. Practically this value of a difference is necessary on 21 digits of value of a electron charge. We find this mark $\Delta e_o = e_o^- - e_o^+ = 9{,}797961064 \cdot 10^{-22}$. We get the reason for gravity and for antigravity, what is formed by weak electrical vacuum charge:

(–Body1+)(– + – + –Ether– + – + –)(+Body2–)

- Coulomb attraction (gravitation),

(– – – – Ether– – – –)

- Coulomb Self-repulsion (antigravitation)

For evident not equality to zero of the sum of charges is shown: **(–)** is more then **(+).** Besides a charging electron and positron difference is shown above which according to the law of preservation of a charge does not give any chances for annihilation charges. The rule is kept and for interaction of electrons and positively charged nucleuses of atoms. Electrons cannot “to fall” onto a nucleus. It is completely new a paradigm to physics, apparent completely improbable, but saving simple substance and theory of structure of vacuum from disorder. It is interesting so that paradigm gets closer to the secret of essence of mass and electrical charge. Thus the consent with the inflationary theory of Large Explosion is found out, in which basis the existence of physical vacuum without a matter, i.e. vacuum without mass is incorporated. The logic conclusion - birth of a matter (masses) follows occurred through conversion of a part of an extremely dense electrical charge of vacuum into gravitating mass. Probably, the processes of conversion occur and at present period as birth of substance in nucleuses of galaxies. All this induces on an idea, that the charge of vacuum is organised in micro clusters for a meson type, which in turn will form macro clusters, breaking uniformity of inflationary vacuum, which have resulted in BB in disorder of quasars nucleuses, to formation of galaxies nucleuses and generation of stars.

Conclusions

1. The main conclusion - vacuum has structure. Such vacuum is similar to an ether, as to physical object.
2. The vacuum exists in three updating: space, meson and nuclear. In a basis of updating the indivisible elementary charges of electron and positron lay.
3. The electron charge surpasses a positron charge on value of $1{,}56980711 \cdot 10^{-40} q$.
4. Formed by surplus of a charge the space vacuum is a source of gravitation and forces of repulsion in the Universe.
5. The law of preservation of charges has by a consequence absence of an opportunity charging annihilation of electron and positron and “fall” electron on a nucleus of atom.
6. In electron structure the information on mass number of a proton is incorporated.
7. All known interactions are different displays of Uniform Force in a Nature - electrical interaction.

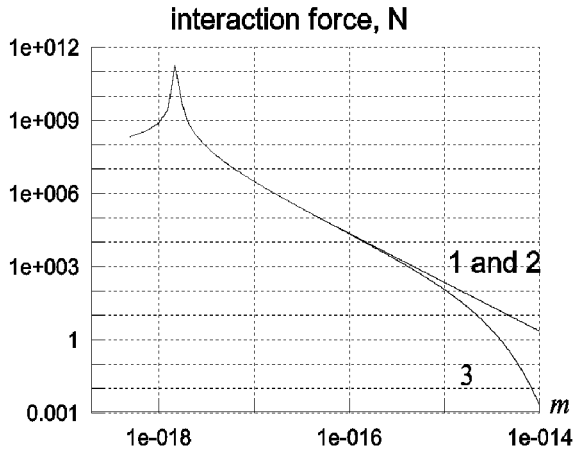

Fig.1.1 and 2 -Colombian and Newtonian force, 3 -count of Ukava potential.