The reason of self-organization systems of matter is quantum parametric resonance and the formation of solitons

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Essay Abstract

How the ideal properties of matter and fields give rise to unfounded generalizations, to meaningless mathematical laws, to goals and to intentions. How are created self-organizing systems? Structure of electron and of de Broglie waves. How it works. Where are can observe real gravitational waves, strings and quantum loop. What do opened in projects LIGO and LISA.

"We cannot solve our problems with the same thinking we used when we created them."
Albert Einstein

"Your theory is crazy, the question is whether it's crazy enough to be true."
Niels Bohr

Introduction

The purpose of this essay: to show the principles of formation of science outlook, free from abstractions and ideals.

Unfounded generalizations are determined in the essay based on observation, analogues, facts and calculations.

In the essay it is shown that the using of mathematical abstractions and ideal properties of matter and fields in the description of physical reality leads to a lack of reasons for the ongoing processes, lead to the abstract particles, to pointless research of collapses, of infinities, of normalization, of calibrations, of clouds of probability and so on. The phenomenological laws and their abstract coefficients spread on everything systems unreasonably and are elevated to the rank of absolutes.

If to use the analogies instead of abstractions and do not use ideal properties of matter and fields, we will have not abstract vacuum, but viscous medium of the physical vacuum with turbulence. The vortices of turbulence there are the toroidal quantum vortexes formed from vortices of deeper level of matter. Vortices are material toroidal gravitational waves de Broglie and Compton and are the deterministic elements of multi level and fractal of the physical vacuum medium.

Example of unfounded use of ideal properties is the assumption about the transfer without dissipation of the real energy by photons through many billions of years. This is although gravitational Doppler Effect is the known.

Photons this are essentially solitons which forcibly moving in its own wave of elasticity like a warp-engine. Photons cannot reduce the speed, like cannot reduce the speed the sound wave, the wave can only be damped due to the viscosity. Therefore, the replacement of dissipation of energy of photons in red shift of galaxies on the "dark energy" does not correspond to reality.

Supposed, the toroidal vortex of physical vacuum medium there are closed photons, material quantum "loops" and "strings", high-Q resonators and they have the potential well of stability. Toroidal vortices this are natural particle accelerators, the source of motion in the universe, and they only one essence from which the universe is forming.

Quantum parametric resonance

Quantum parametric resonance in the medium of the physical vacuum occurs due of the circulation of energy in dynamic vortices turbulence.

The vortexes of turbulence formed in accordance with the laws of hydrodynamics, and they there are main self-organizing process of the material system. Even at the minimum speed of the body in superfluid medium, the turbulence vortexes are formed with minimum characteristic cross section and with maximum speed of matter in the center of the vortex, which is close to the speed of propagation of interaction [**1**],  [5] [**2**].

In contrast to the vortices in the water and air, the neutrino toroidal vortexes[5] of turbulence in physical vacuum medium are stable. They are formed on frequency of parametric resonance; create toroidal gravitational fields (gravispheres). The gradient of the gravitational potential is completely minimizes the centrifugal force of inertia of its elements.

Changes of de Broglie wavelength waves is similarly to transformations of particles in accelerators, similarly to fission and fusion of atoms, they cause non-linearity of the phase state of the physical vacuum medium and is the cause of the classical parametric resonance.

The physical meaning of quantum numbers - this numbers of harmonics and sub-harmonics in parametric conversion bipolar pairs of toroidal gravitational waves de Broglie (of bosons, of gravitons). Set of waves in the system correspond to the distribution of harmonics in the Fourier series.

Unfounded assumption of empty atom and space leads meant that the Mathieu equation for classical parametric resonance turned into a Schrödinger equation in which no reasons for the formation of quantum numbers.

Soliton potential wells of stability and de Broglie waves

Soliton works on the principle of the heat pump action and concentrates the energy in the center gravisphere that leads to self-organization of complex material systems. Soliton realizes the extreme principle of minimal action.

The bodies from atoms and the human body, this is also soliton that composed from a plurality of solitons, at the frequencies of the parametric resonances interacting one with other.

Chemical bonds are created between the resonances frequencies of the interacting quantum gravitational waves de Broglie.

The equilibrium rotation of the physical vacuum medium around the axis of the helical elements in photons (toroidal waves are tear) does not lead to the formation of significant gravisphere and mass.

Non-equilibrium rotation of the medium of the physical vacuum around the annular of axis toroidal gravitational waves causes changes of density medium.

In the center of symmetry of the toroidal vortex there is point of mathematical singularity, where in its vicinity is always formed the vortex of de Broglie wave, which gets the excess energy perturbations, keeping the original wave in a stable quantum condition  .

Gravitational de Broglie wave of an electron plays role of potential well of the stability and it causes to the non-locality and the inertia, in the process of its formation and reformation. Moving electron has spiral trajectory in precessing of de Broglie wave and without the centrifugal force of inertia. Only with acceleration of the electron are generated photons by the "annihilation" of bipolar pairs (bosons, gravitons) and formation of new de Broglie waves.

On the micro- and macro-scale, parametric resonance in nonlinear medium leads to the formation of toroidal orbital gravitational waves (orbital resonance)  [6]  [5] [**1**]  [1] [**7**], which has soliton potential well of stability.

The body on a circular orbit is moving in a specific reference system, when the orbital body does not move relative to the physical vacuum medium of the vortex gravisphere of central body. Therefore, there is no reason to generate the centrifugal forces of inertia and gravity. At the same time, the physical vacuum medium pushes the body in its orbit in soliton wave of de Broglie, fully compensating force of gravity and the loss of energy on the viscosity of the physical vacuum medium. In result, force of the action is generated (an analogue of the Lorentz force) that is cause of the gravitation for orbiting body.

Linearly moving bodies have in the physical vacuum medium multi-pulse inhibition (quantum parametric conversion of waves de Broglie) with an average of Hubble energy dissipation ("dark energy") like "Pioneers 10-11" [9] and photons.

In contrast to the orbital electron and the orbit of the Earth, comets have big eccentricity of orbits. They are attracted to the Sun, because they are related to him by toroidal gravitational waves[2] de Broglie, that form tails of comets[2] [**19**]. Comets are experiencing real multipulse centripetal acceleration (in moment of new impetus is possible the separation of the comet on part, tails are lost and new tails are forming ), and radiate x-ray waves [**6**] in accordance with the Unruh effect. Similarly, comets, Pluto is experiencing strong tectonic activity[7] in moments of replacement of one toroidal orbital gravitational wave on another.

The sun radiates due of the Unruh effect in multi-pulse deceleration of gravisphere of Sun in physical vacuum medium with coefficient of energy dissipation of Hubble. The soliton vortex gravisphere concentrates the energy in the sun.

Gravisphere of sun moves relative to the medium of the physical vacuum in the Orion spiral arm with an average speed of *437 km/s*, equal to its first cosmic speed. Current speed between the pulses of the Sun perturbation is *369 km/s* [**8**].

Elements of the physical vacuum medium in the outer part of the gravisphere of Sun collide and form heavier elements, which are the source of energy for radiation of the Sun (power of radiation is easily calculated [20, Section 6.4.]). In the result is formed background and dipole component of the microwave background, its coordinates coincide with the tangent to the vortex spiral gravitational wave of arm of the Orion [**8**].

Law of conservation of the speed of propagation of gravitational interaction and the force of gravitation

Assumed the moving body forms a vortex. Module of maximum speed of motion of the vortex medium of the physical vacuum is equal υo module body speed υ.

Due to changes in the parameters of gravitational waves de Broglie from their speed in vortex, the density of physical vacuum medium and the speed of propagation of gravitational interaction $\Delta\upsilon_g$ on the body surface $|\upsilon| = |\upsilon_o| = \Delta\upsilon_g$ too are changes.

Evidence of change in the speed of propagation of gravitational interaction υ_g in gravispheres $\Delta\upsilon_g(r) = \upsilon(r) = \upsilon_0 \cdot \sqrt{\frac{r_0}{r}}$ is changing the photon energy $E = E_o \cdot \left(1 - \frac{\varphi_1 - \varphi_2}{c^2}\right)$, moving away from the Sun to the Earth, in accordance with the change in gravitational potential $\varphi = \Delta\upsilon_g^2 = |\upsilon_o|^2$. Similarly to photon, changes kinetic energy, with the free fall of the body to the sun.

The speed of photons in the solar gravisphere is virtually unchanged, due to their low dispersion. For example, if measure the speed of gravitons, that are moving away from the Sun to the

Earth, the Shapiro delay would be in *770 times* greater, than that for photons, due to high dispersion of gravitons (bosons).

As result of the above, was set "hidden" law of conservation of the speed of propagation of gravitational interaction $c_0 = c_g + |\Delta\upsilon_g| = c_g + |\upsilon_o|$. The medium of physical vacuum, together with the earth, is moving at a speed $\upsilon_{oE} = 30 \cdot km/s$ in spherical gravisphere of sun. A medium in the toroidal orbital wave of Earth[1] moves at a speed $\upsilon = 38 \cdot km/s$ and creates dipole component of infrared radiation [**7**]. Michelson and Morley detected the motion of the Earth relative to the physical vacuum medium  at average speed of *8 km/s* [10].

Thus, in accordance with the gravitational potential $\varphi = \upsilon_o^2 = \Delta\upsilon_g^2$, the medium of the physical vacuum in the near-Earth orbit forcedly moves at orbital speed $\upsilon_o = 8 \cdot km/s$ together with the low-orbit satellites. The Earth's atmosphere is a transition layer with a variable speed of the physical vacuum medium relative to the Earth. Near of the surface of the Earth, where the turbulent gravitational shell is forming, the physical vacuum medium, practically, is stationary relative to the Earth, as result of the Fizeau effect. In the gravitational shell act toroidal gravitational waves, which, like the coronal loops and granulation in the Sun, penetrate Earth with equivalent speed $\upsilon_o = 8 \cdot km/s$ and inhibit the rotation of the medium of the physical vacuum around the Earth.

Changing of the speed of propagation of gravitational interaction leads to an acceleration of neutrino gravitons in gravitational waves emanating from the Earth and to the braking of gravitons moving toward Earth. Reactive force of accelerated motion of gravitons generates force of attraction of bodies to the Earth. Quantum transformation of each graviton, with changing its speed, leads to the formation of momentum force of gravity or inertia.

Nonconformance of the motion of stars in the galaxy to Newton's law of gravity is caused by two different observed pats of gravispheres of the solar system and of galaxy. Gravisphere of solar system repeats gravisphere of Galaxy. In the central part of the spherical gravisphere of Sun works just Newton's law of gravity, due to the variable gravitational potential, of variable density and variable temperature of physical vacuum medium from *5600˚K* on the Sun and *2.7˚K* behind the Kepler's belt.

However, if the internal gravisphere is a single spherical vortex medium of the physical vacuum, then the outer gravisphere consists of two vortices, swirling in the two main spiral arms. I.e., like the Galaxy, the outer part spherical gravisphere of Sun contains the spiral arms, as well as the "bulge" in the form of the Oort cloud.

The outer surfaces of the spiral arms of galaxy have gravitational shells at the same temperature in the same gravitational potential and stars have same speed of forced orbital motion, which does not correspond to Newton's law of gravitation. Thus, there is no need to take the "dark matter" to explain independence of the speed of the orbital motions of stars in galaxies from their distance from the center. Dutch physicist Verlinde [5] made the same conclusion. Should agree with his assertion that gravitation can be is explained by the difference in the density of entropy in the space between the two bodies. Gravity is not a fundamental force of nature, but only occurs as consequence of quantum activity in the same way as the temperature is the result of the interaction of subatomic particles.

Thus, assumed the idea about gravity must change radically. The attraction of celestial bodies in circular orbits seems only. Couples of illogical tides from "attraction" of the moon and the sun are the result of couple of ebbs of heavy water due action of the toroidal orbital gravitational waves.

Structure of electron

It is generally accepted, the electron is indivisible and structureless, has two radii (classical radius is calculated but not measured, and the measured radius of wavelength of Compton). The

electron has abstract spin and creates the clouds of probability of finding the electron, in the form of de Broglie waves. Indeed, the cross section of electron interactions are not infinitely small, and is less than *1%* [**16**] but this does not mean that it is indivisible and structureless.

Assumed, the electron consists of *137* quarks (the cross section of the electron interaction is less than *1%*). This is indicated by the reciprocal value of the fine structure constant $1/\alpha = 137.036$.

Paradox of mass can be is resolved by principle additivity of angular momentum in classical mechanics and therefore the law of conservation of energy is performed. Then angular momentum $\hbar_{qe} = \alpha \cdot m_e \cdot c \cdot r_e = \alpha \cdot \hbar$ of quark must be 137 times smaller than the angular momentum of the electron. On *137* quarks (*68* of bipolar pairs *+1*) in electron shows classical radius of the electron, which is *137 times* smaller than the radius of wave Compton of electron. At the same time, one odd quark determines the charge of electron and mass of quark of electron $m_{qe} = \alpha \cdot m_e$.

Fractality of matter

If the electron (of matter level *n=-1*) is composite, then it must be assumed that the quark also is the divisible particle and consist from preons (*n=1*), and the preon consist from amers (*n=2*), the amer consist from X1 - particles (*n=3*), etc. The fractal structure of the electron can be thought of in the form of a ring, with a radius of the Compton wave, it consists from *137* quarks. Based on Fractality of matter, similar to the number π, the fine structure constant is the geometric parameter $\alpha = d_{qe} / \lambda_e$.

Elements of different levels are neutrinos for each other due to different angular momentum. Each level has its own limit elements of matter, analogous to the electron, which are also common in the universe, like the electron.

Found that preons (*n=1*), from which consist quarks (*n=0*), there are tachyons and they have speed of propagation of interaction $\upsilon_{t-1,0} = \upsilon_{t0,0} = 43.6 \cdot c$. Consequently, the total mass of the quarks in the electron is in *1903 times* less than the mass of the electron. In the very deepest levels of matter mass tends to zero, and the speed of propagation of interaction tends to infinity. I.e., in fact, matter is composed of energy.

Non-locality caused due to the interaction of matter with the help of elements of the de Broglie waves of deep levels of matter. The first attempts to measure the speed of interaction of entangled particles led to speed of about *100 000* of light speed [15]. The estimated value of this speed corresponds to the speed of propagation of interaction in amer matter level *n=2* $\upsilon_{t2,2} = 83000 \cdot c$. It is obvious that such speed of propagation of interaction can have de Broglie waves of the electric field. For example, in Equations of Maxwell accepted the propagation speed of interaction of the electric field is equal to infinity. Otherwise, Maxwell's equations do not have solutions [17], and the actual speed, almost no effect on the result.

Fractal and multi-level principle of the matter device allows you to calculate its elements, which are confirmed by experiment [20, Section 5.], in contrast to the string theory and loop quantum gravity.

How does this work

When the speed of motion is changing, the de Broglie wavelength of an electron $\lambda_{dBe} = \frac{h}{m_e \cdot \upsilon} = \frac{m_e \cdot c \cdot \lambda_e}{m_e \cdot \upsilon} = \lambda_e \cdot \frac{c}{\upsilon}$ while maintaining the angular momentum $h_{dBe} = h = m_e \cdot c \cdot \lambda_e = m_e \cdot \upsilon \cdot \lambda_{dBe} = m_{dBe} \cdot c \cdot \lambda_{dBe}$. Moreover, the de Broglie wave are formed as, a

result of the quantum parametric resonance with the precession frequency of with Compton wave  on common resonant frequency $\nu_{dBe} = \frac{c}{\lambda_{dBe}} = \nu_e = \frac{\upsilon}{\lambda_e}$.

It should be noted that in these relationships, de Broglie wave has mass $m_{dBe} = m_e \cdot \frac{\upsilon}{c}$, and there is a particle in the electronic level of matter. I.e., the whole set of elements of the electronic level of matter this is analogues of gears Maxwell (Maxwell's cogwheel/idle)  .

There are secondary de Broglie waves from the de Broglie waves of electron. For example, it is known that at a voltage of *1 μV* frequency of photons on Josephson junction is *483 MHz*. Under the influence of this voltage each electron pair of Cooper accelerates to the speed

$$\upsilon_e = \sqrt{\frac{2 \cdot e \cdot U_D}{m_e}} = 593 \cdot \frac{m}{s}.$$

In this case, the frequency of the photons equal $\nu_{D2dB} = \frac{E_{D2dB}}{h} = \frac{2 \cdot e \cdot U_D}{h} = \frac{c}{\lambda_{D2dB}} = 483 \cdot MHz.$

The length of the secondary de Broglie wave of an electron is

$$\lambda_{D2dB} = \lambda_{D1dB} \cdot \frac{c}{\upsilon_e} = \lambda_e \cdot \left(\frac{c}{\upsilon_e}\right)^2 = \frac{c}{\nu_{D2dB}} = 0.62 \cdot m.$$

Moreover, the kinetic energy of the pairs of electron Cooper equal to the energy of the pair of secondary electron de Broglie waves (to boson)

$$E_{ke} = 2 \cdot m_e \cdot \frac{\upsilon_e^2}{2} = E_{D2dB} = E_{D2ph} = 2 \cdot m_{D2dB} \cdot \frac{c^2}{2} = 2 \cdot 10^{-6} \cdot eV.$$

It should be noted that the de Broglie wavelength equal to the wavelength Compton, at the speed of motion of the electron, equal to the speed of light. Consequently, the relativistic electron mass is equal to the mass of the plurality of de Broglie waves in its gravisphere, mass of which are close to the mass of the electron. Consequently, the electron this is the limit particle, which is "pressed" to the limit speed of propagation of interaction, like to wall.

The use of the gravitational coefficient for the solar system, along with the Planck constant (angular moment of an electron) in the calculation of the Planck length $\lambda_{Pl} = \sqrt{\frac{\hbar \cdot G}{c^3}} = 1.616 \cdot 10^{-35} \cdot m$ and mass $m_{Pl} = \sqrt{\frac{\hbar \cdot c}{G}} = 0.0218 \cdot mg$, is a gross mistake.

If we equate for Earth the physical form of the law of gravity and recording in phenomenological form of Newton's law, we can determine from which parameters bodies and their orbits depends the gravity coefficient for the specific planetary systems

$F = m_b \frac{\varphi_E}{r_E} = m_b \frac{\upsilon_{1E}^2}{r_E} = (G) \frac{m_E \cdot m_b}{r_E^2} = \left(\frac{\upsilon_{1E}^2 \cdot r_E}{m_E}\right) \frac{m_E \cdot m_b}{r_E^2}$. Where: The gravitational potential $\varphi_E = \upsilon_{1E}^2$ is equal to the square of first cosmic speed of the Earth. The multiplication result $\upsilon_{1E}^2 \cdot r_E$ is constant for given planetary system and is an analog of the *3-rd* Kepler's law.

Substituting gravitional coefficient of planetary system of electron $G_e = \frac{c^2 \cdot r_e}{m_e} = 5.709 \cdot 10^{44} \cdot G$ in the formula for calculating the Planck mass and length, we get the parameters of the Planck value equal to the parameters of the electron.

It means that there are no fundamental particles of electronic level of matter with a greater mass than the electron. Therefore, the Planck mass and Planck length waves, the event horizon and the black holes are not sufficiently substantiated the abstract generalizations, which have no physical meaning.

Thus, gravitational and other phenomenological coefficients for every system must always be calculated, otherwise their use does not make sense.

It should be note that the speed of movement of elements of matter on the ring of each toroidal vortex gravitational wave de Broglie and Compton of electron is equal to the speed of light. Therefore, in each element of physical vacuum medium is formed the limiting gravitational potential.

In accordance with limiting gravitational potential of the elements of matter of physical vacuum medium, photons or gravitons (of quark level) forced and equilibrium move with the speed of light in soliton potential wells of stability of waves de Brogue. Elements of electronic level of matter can move equilibrium in superconductivity with speed in 43.6 times slower than the speed of light.

The limiting elements of matter

Using parameters of electron, principle of additivity for angular momentum of composite elements, the energy conservation law and the principles formation of the de Broglie waves, were composed similarity equations for calculating of the parameters of limit elements at any level of matter [20, Section 5.] and of any of fundamental elements.

Adjacent wavelengths of limiting elements are distinguished in $\lambda_{-1,-1}/\lambda_{0,0} = 1/(\pi\cdot\alpha)^3 = 83000$ times. The energies are distinguishing in $E_{0,0}/E_{-1,-1} = 1/(\pi^2\cdot\alpha) = 13.9$ times. The speed of propagation of interaction and the required speeds of perturbations are distinguishing in $\upsilon_{t0,0}/\upsilon_{t-1,-1} = \upsilon_{V0,0}/\upsilon_{V-1,-1} = 1/(\pi\cdot\alpha) = 43.6$ times. The angular momentum is distinguishing in $h_{-1}/h_0 = 1/\alpha = 137.036$ times.

Assumed that the u-quarks are formed on the 2-nd subharmonic of d-quarks, but measuring their parameters is difficult due elements on the 3-rd and 4-th harmonics. The known energy of quark close to calculated parameters limiting elements of different matter level.

Name of limit element.	Level matter.	Calculated energy.	Experimental energy value [14].
Electron	*n=-1*	$E_{-1,-1} = 511\cdot keV$	$511\cdot keV$
u-quark	*n=0*	$E_{0,0} = 3.548\cdot MeV$	from to
d-quark	*n=0*	$E_{0,0} = 7.096\cdot MeV$	from $3\cdot MeV$ to
«s-quark» - preon	*n=1*	$E_{1,1} = 98.525\cdot MeV$	$95\pm 25\cdot MeV$
«c-quark» - amer	*n=2*	$E_{2,2} = 1.368\cdot GeV$	$1.25\pm 0.09\cdot GeV$

Registration and parameters of gravitational waves

Strings and loops of string theory and gravitational waves are have long been observed and are researched, but "see" their do not give all the same phenomenological generalizations in science without sufficiently rationale. The gravitational waves cannot propagate in space, like the photons, because they are elements of other level and they possess a gravitational mass. Gravitational waves are stationary, as particles and they are vortex gravitational toroidal fields[5]  , which can be transforming into photons and vice versa. Their action is observing in shape of plurality annular orbital resonances  [1].

On Saturn's rings observed in detail the action of the fan[4] toroidal gravitational waves (real strings) Saturn's moons  [4]. Saturn's moons the Prometheus and the Pandora are attracted to each other, do not attracted to big Saturn, by means of the fan[4] stationary toroidal vortex of gravitational waves[6], like a comet attractive to sun  [2]. Depending on the position the Pandora regarding of Prometheus and Pandora, is changed the direction of action of the force on the Prometheus [**4**] - in side of Saturn  , or from Saturn  . Like comets lose their tails  ,  [2] the satellites of Saturn "lose"[6] its toroidal gravitational waves, create the impulse of force and create new waves. The complex nature of multi-pulse of interaction between satellites and Saturn can view on the rings of Saturn  , with maximum of action of the force with the minimum distance between satellites.

Dimensions galaxies, Supergalaxy, superclusters of galaxies, stars, planets and their satellites are synchronized with limiting elements.

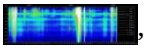
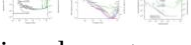
For example, the radius of Saturn's orbit is determined by the radius of limit elements of matter level *n=-6* $r_{-6,-6} = 1520.68 \cdot \text{million} \cdot km$. The radius of the orbit of Jupiter is defined by toroidal gravitational waves, which is formed on *2-nd* harmonic limiting element *n=-6*. On the 3rd harmonic of the limit element *n=-6* is formed toroidal gravitational wave with the radius of the asteroid belt $R_{OS} = (R_S - 27000 \cdot km)\frac{c}{\upsilon_{1S}} = 458 \cdot million \cdot km$, with the period of rotation of the gravitational wave *160 min*, which is a toroidal gravitational de Broglie wave of the sun.

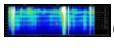
The surface of the Sun is experiencing oscillatory process with a period of *160 min*. Approximately with this period of *160 min* wave of the disturbance is moving across the solar surface at speed equal to the first space solar speed *437 km/s*.

Orbital toroidal gravitational waves of Mars (*228 million kilometers*), of Earth and of Venus formed, respectively, on the *2-nd, 3 rd* and *4-th* harmonics of the de Broglie wave of the sun. The small decrease of the radius of the orbits is due of dispersion of the waves  and corresponds to the direction of energy to the planets.

The radius of the orbit of the Earth is connecting rigidly with radius of the inertia of the Earth $r_i = 4000 \cdot km$ and the first cosmic speed $\upsilon_1 = 8 \cdot km/s$ by new relation for the de Broglie waves $r_o = r_i \cdot \frac{c}{\upsilon_{1E}} = 150 \cdot million \cdot km$, in which the de Broglie wavelength is independent of the mass, but depends on the radius of inertia of body. With Earth's radius of gyration, in bowels of the earth is formed a pair of toroidal gravitational waves, playing the role of waves "Compton".

The radius of the Earth, as well as of Venus, are connected on the Schumann resonance frequency *7.83 Hz*, which is formed on the *3rd* harmonic of limit elements $r_{-5,-5} = 18322 \cdot km$ with frequency $\nu_{-1,-5,-5} = c/\lambda_{-5,-5} = 2.60 \cdot Hz$ which form a toroidal harness of limiting elements with a radius in *3 times* more of the Earth's radius  . In the HAARP project, ware registeredthe stationary toroidal gravitational waves with abnormal frequency of *2.6 Hz*[3]  .

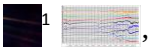
Electromagnetic methods of investigation, in contrast to the gravitational methods are weakly sensitive to limit elements at a frequency of *2.6 Hz*  , due to their high resistance to parametric reformation in phonons. Outstanding research is the detection of stationary toroidal gravitational waves with frequencies of Schumann waves in the project the LISA  [12] and the frequency *2.6 Hz* $\nu_{-1,-5,-5} = c/\lambda_{-5,-5} = 2.60 \cdot Hz$. This discovery limiting elements $r_{-5,-5} = 18322 \cdot km$ *n=-5*  equivalent to the discovery of the electron.

In the Earth's magnetosphere often occur conversion powerful toroidal gravitational waves. In this case, there are intense bursts of electromagnetic radiation  over a wide frequency range

and recorded the characteristic signals of gravitational waves LIGO project, that unreasonably taken as the signals from the "binary pulsars". Methods of research in gravitational projects LIGO and LISA are prohibitively expensive, due to the unreasonable assumptions about the propagation of gravitational waves beyond the borders stellar gravispheres and about mechanisms of gravity.

It is known that on the surface of the flat bodies there is Casimir effect, which is associated with the presence of turbulent gravitational shell and large gradient of the gravitational potential. Gravitons (bosons, fermions pair), unlike photons (of pairs of spiral baryons) have high variance  , because of the strong resonant coupling between pair of elements. Gravitons have total internal and external reflection on surfaces of bodies and generating an force in the gradient of the gravitational potential of gravitational shells. For example, an X-ray telescope this is the gravitational telescope, [13].

By the author of this essay has implemented a very simple gravitational variometer, in the form of a torsion balance on the two adjacent threads. One body of gravitational variometer is designing as the flat packet of the plurality of light bodies (*300* sheets of writing paper between by the framework of the same paper). Such gravitational variometer has plane directional pattern and it is in ten times more sensitive to gravitational waves than the massive body of detector LIGO and LISA project, which have only two planes.

With the help of this gravitational variometer was registered gravitational action of gravitons flows in the orbital gravitational wave of the Earth  , every day from noon to midnight, while the bright spot of dipole component of infrared radiation is moving across the sky (*13 μm* [18]), with delay from sun of *6 hours*  .

Conclusions

One generalization, insufficiently substantiated, gives rise to many generalizations that give fantastic representation about universe.

The assertion of the existence of quantum phenomena only in the microcosm is not sufficiently substantiated the phenomenological generalizations.

The physical vacuum medium - there is the material, non-linear, multi-level and fractal medium. All transformations and interactions of matter in the classical world are carriing out with help of the main universal process - with help of quantum parametric resonance in the physical vacuum medium - with forming soliton.

The period of rotation of matter in the of limiting elements provides stable and uniform flow of absolute time in the universe and is the basis of parametric reproduction of the same type of matter elements and chemical bonds.

Mass does not distort space-time, but changes the spatial coordinates derivative with respect to time - speed of propagation of gravitational interaction and speed of physical processes in the vortex of the physical vacuum medium.

Newton's law of gravity is valid only near the surfaces of celestial bodies of the solar system, similar to the Casimir effect, near the surfaces of the bodies. Newton's law of gravity is a particular solution of the general law of gravitation in the fundamental gravitational interaction, which has property to form the potential well of stability, as the strong interaction.

Based on common properties - forming a potential well of stability and total quantum mechanism of formation of forces - can unite all fundamental interactions by unified formalism.

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The technical endnotes

[1] https://saturn.jpl.nasa.gov/resources/5836/?category=images. (Accessed on 2/20/2017).

From Voyager's great distance Earth is a mere point of light, less than the size of a picture element even in the narrow-angle camera. Earth was a crescent only *0.12 pixel* in size.

Coincidentally, Earth lies right in the center of one of the scattered light rays resulting from taking the image so close to the sun. This blown-up image of the Earth was taken through three color filters -- violet, blue and green -- and recombined to produce the color image. The background features in the image are artifacts resulting from the magnification.

[2]. At a minimum distance from the Sun, Comet McNaught repeatedly "lost" their tails (orbital toroidal gravitational waves accompaniment).

[**19**] - Gloeckler is the principal investigator on the Solar Wind Ion Composition Spectrometer (SWICS) aboard Ulysses, which measured the composition and speed of the comet tail and solar wind. The solar wind consists of high-speed streams of plasma that emanate from the sun's outer atmosphere. Not only did SWICS detect unexpected ions in the comet tail, it found that the tail had a major impact on the surrounding solar wind.

For the first time at a comet, researchers detected *O3+ oxygen* ions (atoms of oxygen with a positive charge because they have five electrons instead of eight). This suggests that the solar wind ions, originally missing most of their electrons, picked up some of their missing electrons when they passed through McNaught's atmosphere. The comet served as a source of electrons, said Michael Combi, a U-M space science professor who is an author of the paper.

SWICS also found that even at *160 million miles* from the comet's nucleus, the tail had slowed the solar wind to half its normal speed. The solar wind would usually be about *435 miles* per second at that distance from the sun, but inside the comet's ion tail, it was less than *249 miles* per second.
"This was very surprising to me," Combi said. "Way past the orbit of Mars, the solar wind felt the disturbance of this little comet. It will be a serious challenge for us theoreticians and computer modelers to figure out the physics."

Space science professor Thomas Zurbuchen, a U-M author of the paper, likened Ulysses' pass to putting your hand in the waters of Lake Michigan and pulling out a fish.
"That's a pretty unlikely thing," Zurbuchen said. "And that is a lot like what happened when we caught the tail of a comet that happened to pass very near the sun.

[3] «In the HAARP project, when the shock outrage is introduced in the auroral zone of electrojet cycles around the path of the electrojet *2.5 times* (*2.5 Hz*) to *3 times* (*3 Hz*) a second until it dissipates. The apparent resonant frequency of the electrojet is determined by its circumference  .»

[4] **https://saturn.jpl.nasa.gov/resources/5113/?category=images. (**Accessed on 2/20/2017). August 31, 2010**.** The Cassini spacecraft spies a "fan" in Saturn's tenuous F ring.
This fan-like structure appears as dark lines spreading outward from the left of the bright clump of ring material near the center of the image. See Multiple F-Ring 'Fans' (Accessed on 2/20/2017) and 'Fan' in the F Ring (Accessed on 2/20/2017) to learn more about fans.

[5] http://www.spacenewsbg.com/data/Saturn_rings1.jpg. (Accessed on 2/20/2017). https://saturn.jpl.nasa.gov/resources/3800/?category=images. (Accessed on 2/20/2017) October 15, 2007 + View Video. (Accessed on 2/20/2017) The moon Prometheus slowly collides with the diffuse inner edge of Saturn's F ring in this movie sequence of Cassini images. The oblong moon pulls a streamer of material from the ring and leaves behind a dark channel.

https://saturn.jpl.nasa.gov/resources/3948/?category=images. (Accessed on 2/20/2017) February 11, 2008
Two dark gores in Saturn's F ring demonstrate the gravitational influence of the shepherd moon Prometheus.
The older gore at the top of this view is at a steeper angle than the newer addition just above and to the left of Prometheus, since the former has sheared out over the course of an orbit: particles on the inner (right) side of the F ring travel faster in the same amount of time than the particles on the outer (left) side, leaving the outer particles behind.
Prometheus (*102 kilometers*, or *63 miles* across) is lit at left by direct sunlight and at right by reflected light from Saturn. The bright, sunlit portion of the moon is overexposed.
https://saturn.jpl.nasa.gov/resources/4527/?category=images. **(**Accessed on 2/20/2017).
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https://saturn.jpl.nasa.gov/resources/5509/?category=imageshttps://saturn.jpl.nasa.gov/resources/3347/ . **(**Accessed on 2/20/2017).
November 6, 2006 A shepherd moon can do more to define ring structures than just keep the flock of particles in line, as Cassini spacecraft images such as this have shown.
Prometheus (*102 kilometers*, or *63 miles* across) is seen here with two long streamers of material that it has pulled out of the F ring. When Prometheus comes close to the F ring in its orbit, the moon's gravity tugs on the ring particles. The disturbed particles, now pulled into orbits slightly closer to Saturn and therefore faster, shear out during successive orbits, creating the long and delicate streamers seen here.

[6] https://saturn.jpl.nasa.gov/resources/5070/?category=images. (Accessed on 2/20/2017).
Prometheus loses its toroidal gravitational waves that move along with it in one complex, but do not pass through it.

[7] https://www.wired.com/2015/07/new-horizons-back-action-new-pluto-snapshot/. (Accessed on 2/20/2017). “The most striking geology is that we haven’t found a single impact crater,” says John Spencer, one of New Horizons’ lead scientists. “That means this is a very young surface.” “Young” being less than 100 million years old.
So what could be driving that geologic activity? There’s no planetary body large enough to be driving tidal energy, so Spencer speculates that the energy could be driven by latent radioactive energy, or a large interior ocean could release energy as it freezes. Or, the planet could be storing energy from its formation through some other, unknown process.