

AETHEREAL MECHANICS

Dedicated to the bright memory of my daughter Anastasia

In this paper the concept and results of researches of phenomena, discovering the actual physics of gravitation is stated. It is shown, that the existing theories of gravitation, since Newtonian, are artifacts, the difficulty of the "three bodies problem" in celestial mechanics is explained by ignorance of a true nature of gravitation. It is shown, that the cosmic aether is a single force generating physical phenomena in the Nature. The example of calculation of Lagrange's points through technology of ethereal mechanics is adduced, that is shown, that not only the "three bodies problem", but also a set of many bodies is solved within the framework of the offered approach easy.

*"I will deliver him; I will protect him, because he knows my name"
[Psalm 91]*

Based on natural phenomena and regularity discovered by the author during research of properties of space aether [1-17], and also based on results obtained by classics of physics Galileo Galilei [18], Robert Hooke [19], Daniel Bernoulli [20], Leonhard Euler [21], we will consider the actual physics of process of gravitation and phenomena inevitably following from physics of this process.

However for clearing the motivation of this research for readers, we will consider background situation since Newton in the theory of gravitation and celestial mechanics, as far as the volume of this article allows.

The Beginning of Free Falling in Absolute Vacuum

*13 Thou shalt not kill.
14 Thou shalt not commit adultery.
15 Thou shalt not steal.*

[Exodus, The Ten Commandments, 20]

The beginning of falling in an abyss of fallacies began not from the moment of the invention of absurd and not matched with practice relativistic GTR, but much earlier - since times of Isaac Newton. In those times the fundamentals of the true physical theory of gravitation was already made by Rene Descartes - at a qualitative level, as the theory of the space aether and by Robert Hooke - quantitatively, as the theory of an elasticity of the substance and the aether.

As it seems for the author and for well-known investigators of history of 17-th century science [22, 23], Isaac Newton - mostly alchemist and financier than physicist, was so grasped by idea of own glory that having received papers of Robert Hooke - the curator of experiments at Royal Society, supported by his friend Edmund Halley, has decided to publish the "own version" of celestial mechanics.

There was enough time for meditation and tearing relations with alchemy for him. His first paper "*Philosophiae Naturalis Principia Mathematica*", 1687 [31], was published 13 years after classical transactions of Robert Hooke, 1674 [19] and 8 years after the moment of obtaining materials of Robert Hooke on the theory of gravitation, sent personally to him from Robert Hooke in 1679 [22].

The first action of Isaac Newton assigned as head of Royal Society after Hooke's death in 1703, was the instruction about destruction of Hooke's laboratory and all Hooke's portraits. Thus, the world science has lost an essential part from hundreds discoveries and inventions made by Hooke and even his image. That was "human" aspect.

In scientific aspect was following. After issue of the first paper of Isaac Newton "Principia", there was became clear for scientific community, that this paper is practically a compilation of 13 years old Hooke's work. Hooke has not slowed down with the protest. It was necessary for Newton how to get out of a forming scandalous situation (by the way such situation was not unique in his life - claims in plagiarism to him were charged by Leibnitz - on the theory of an integral and by Huygens - on the theory of light). The solution was retrieved. Newton, having seen, that for a prediction of motion of celestial bodies it is enough mathematics only, has decided to throw out aether as gravitational force from his "own" theory. If in the first paper [31] echoing Descartes and Hooke, he asserted:

"That one body may act upon another at a distance through a vacuum, without the mediation of any thing else, by and through which their action and force may be conveyed from one to the other, is to me so great an absurdity, that I believe no man who has in philosophical matters a competent faculty of thinking, can ever fall into it"

in the subsequent papers he criticized Cartesian philosophy in every possible way, asserting that space is "absolute geometry" and "the operation of gravitation is transmitted instantaneously from one celestial body to another according to God's will". Thus he was a real ancestor of known reactionary movement "Newtonianism".

"Hypothesis non fingo" - in Latin manners the soul of the bookkeeper who has got used to count and to not lift off his sight from rows of digits spoke. Actually, everyone, who has met with process of research even few, knows that without offering hypotheses it is impossible to do any step in research. Newton really had not "to invent" - he has taken a ready decision.

On the other hand, having offered absurd hypothesis about absolute empty spaces and having promoted it Europe-wide having practically unlimited political and financial resources, Newton - the manager and director of a the British Royal Mint, having raised itself on a pedestal of "almost divine mind" has immersed physics of Europe in a gloom of absolute vacuum for several centuries.

Wanderings of Ptolemy Scions within a Wood of Three Pines

"There are four chief obstacles in grasping truth ... namely, submission to faulty and unworthy authority, influence of custom, popular prejudice, and the concealment of our own ignorance accompanied by an ostentatious display of our knowledge."

Roger Bacon

The author would not to belittle the mathematical genius of mathematicians of post-Newtonian time, however it is necessary to recognize that to be the good bookkeeper does not mean to be the good carpenter, mathematics is not physics, though it will be used by physicists as the tool, and physics is not mathematics, as in physics at any moment can be discover the new phenomena which are not inscribed in aged theoretical model.

Today even simple man in the street knows, that in a celestial mechanics the calculation of motion even of three bodies is a problem, not speaking about a lot of bodies. Sources of today's difficulties are there - in denying of aether. It is possible to take any textbook on astronomy and to see many nonsenses [25-30].

Mismatch of the operational forces to character of motion of celestial bodies. If we follow to "Newton's laws", which actually do not belong to him (the first and the second are Galilean, the third is Huygens's, and the law of gravitation is Hooke's), forms a directly absurd situation. The force of the Sun acting on Moon exceeds force of the Earth in two and a half of times, but Moon does not tear off the Earth and revolves on practically circle orbit around of our planet.

Newtonian attractive force for Moon by the Sun is

$$F_S = GM_m M_S / R_S^2 = 6.67 \cdot 10^{-11} \cdot 7.35 \cdot 10^{22} \cdot 1.99 \cdot 10^{30} / 1.49 \cdot 10^{11} = 4.39 \cdot 10^{20} \text{ [N]}$$

where G - is a gravitation constant, M_m - is a mass of Moon, M_S - is a mass of the Sun, R_S - is a distance up to the Sun.

Newtonian attractive force for Moon by the Earth:

$$F_E = GM_m M_E / R_m^2 = 6.67 \cdot 10^{-11} \cdot 7.35 \cdot 10^{22} \cdot 5.97 \cdot 10^{24} / 3.84 \cdot 10^8 = 1.98 \cdot 10^{20} \text{ [N]}$$

where M_E - is a mass of the Earth, R_m - is a distance between Earth and Moon.

On this simple example of *three bodies* it is visible, that "Newtonian" forces are not a reason of motion of celestial bodies. In a celestial mechanics for these forces the concept of radius of *sphere of gravitation* R_N , is entered which sets the size of a zone of excess of gravity of a considered celestial body above forces of third celestial body

$$R_N \approx R_S \sqrt{\frac{M_p}{M_S}}$$

where M_p - is a mass of a considered celestial body (planet), M_S - is a mass of a third body (Sun), which satellite is a considered body.

Apparently, that equal for the Earth 260 thousand km this radius does not cover Moon ... Nonsense!

For removal of this nonsense of celestial mechanics have entered other radius, approximated also

and theoretically unfounded, radius of a *planet action sphere* R_{sp}

$$R_{sp} \approx R_s \sqrt[5]{\left(\frac{M_p}{M_s}\right)^2}$$

This radius component for the Earth is 925 thousand of km and it covers orbit of Moon, but on check-up it does not determine a planet action sphere, as the Earth satellites can have though also unstable, but more high-altitude orbits ... Nonsense!

In 1878 G. Hill has entered a value more appropriate to a reality and called subsequently as a radius of a *Hill's gravitational sphere* [24]

$$R_H \approx R_s \left[\left(\frac{M_p}{3M_s}\right)^{1/3} - \frac{1}{3} \left(\frac{M_p}{3M_s}\right)^{2/3} - \frac{1}{9} \left(\frac{M_p}{3M_s}\right) \right]$$

However this radius was not equitable in all cases. As a result of practical search of conformity one more concept - *sphere of influence of a planet* was introduced. Its radius retrieved empirically again approximately is [25]

$$R_{ip} \approx 1.15 R_s \sqrt[3]{\frac{M_p}{M_s}}$$

Nonsense behind a nonsense. The celestial mechanics proclaiming itself as a most precise science after mathematics and an astronomy, makes such lapses.

If the reader will object - "the space vehicles fly all the same", the author will answer, that it is not due to a Newtonian celestial mechanics, but due to achievements of computer technology and practical ballistics, when for achievement of practical results the only empirical methods, for example, a "method of pasting trajectories" is used, which essence consists of recursive count and orbit correction on each small section, considering the action of gravitational forces for each section as static [26].

Lunar epopee. The professionals know, that the self-glorification of celestial mechanics in case of such simple and would seem, clear example, as the "theory Moon motion", has no any basis. Moreover, all history of the this problem shows a full inconsistency of a celestial mechanics as physical science (it can not be mathematical science, as Moon is not mathematical object). Brilliant names of mathematicians Clairaut, D'Alembert, Lagrange, Laplace, Poisson, Newcomb, Delaunay ... All forces were casted on finding picklock to a door of the Moon's secret room. With each new theory, even the listing of which can take a volume of the whole book, see, for example, [27], the number of new mathematical equations without any physical sense are grown. It was seem that those sets of equations permit more precisely and precisely to predict motion of the Moon *for past period of measurements*. Actually we see a case similar to usual approximation of unknown empirical function (series), when the success depends on a harmonicity of incoming data. If an input series represent sampling values of a sine wave, it is a sin to speak: "I have predicted new values on millions years forward". The invention of computers has inspired mathematicians more, but it has not approached to the *physically sensible* solution of a problem.

One of the authors inspired writes: "The success of the first machine theory of motion of Moon was obvious. It became clear, that using a computer it is possible to program any theory, to receive results with vast accuracy and to compare them among themselves, with results of the classical theories and with the most precise observations."

Other respected author wrote "As the overwhelming majority of problems of a celestial mechanics does not fall into integrated in quadratures, for their solution the different versions of recursive procedure designed."

Ponder upon this delirium. That is ode to mathematical picklock and primacy of outcome by any way, even negating physics in physics itself.

".. *does not fall into integrated in quadratures*" - there is a straight line ascertaining of absence of a measure in the theory of a gravitation, even the measure not in physical sense, but only in the mathematical mean (Lebesgue, Stieltjes, Kolmogorov ...), that is what mathematicians should follow strictly, if they want that their theory should be named the theory instead of hackerhood.

It was possible continue paradoxes going to a "near-field" problem in the modern theory of gravitation, but it is a separate large subject leaving for frameworks of the present article.

Thus, it is possible to state, that the modern Newtonian celestial mechanics correctly decides only a problem of behavior of a small body in a gravitational field of one spherically symmetrical heavy body, when its formulas coincide practice.

Let's begin from Democritus, Descartes, Hooke and Planck

*" And God called the firmament Heaven."
[Genesis, The Creation, 8]*

For great Democritus it was not required of the computer and accelerator of particles to reach a conclusion about a discretization of natural substance. The "scientific majority" has recognized atoms of Democritus less than two centuries ago, and his amers still wait of understanding. However, if we do not route waters of Alphaeus to Augean stables, ... the muck will be at the same place.

On a sight of the author the constitution of the Universe is following.

1. The Universe is strictly causal.
2. The Universe is implemented in a flat three-dimensional Euclidean space and one-dimensional single-directional time. That is consequence of causality.
3. All Space fills with special discrete protomatter - the aether.
4. Amers of Democritus are undivided identical units of aether.
5. Amers have only two states determining two kinds of aether - corpuscular (stable, nonexcited) and phase - excited state.
6. The corpuscular aether consists from nonexcited amers, presenting spherical gyros collected in domains.
7. Phase aether - two-dimensional pseudo-gas freely distributing along boundaries of domains.
8. Electromagnetic field is a joint polarized excitation of phase and corpuscular aethers.
9. The substance (material) is excited state of domains of a corpuscular aether, when a phase transition of a phase aether (pseudo-gas) into corpuscular aether (pseudo-liquid) happens.

The causality determines conservation laws. That is anything can not derived from nothing. From here the origin of linearity of space and time. In other case it is senseless to speak about a commensurability, existence of a measure of different phenomena, concepts of preservation. From here the reason of eternity of existence of the Universe.

Thousands years ago Democritus has expressed thought, that without acceptance of a discretization it is impossible to think of continuity and has offered the concept of amer - the undivided unit of proto-matter - aether being a base for origin of visible substance (material).

The energy content of aether is extremely great. Basically it was counted up by great Max Planck. This is a quantity of amers, having the Planck Radius $1.616 \cdot 10^{-35}$ m existing in cubic meter multiplied on the Planck Energy $1.956 \cdot 10^9$ [J], that is total - $1.11 \cdot 10^{113}$ [J/m³].

Density of substance in the Universe, as is known, is evaluated in $1 \cdot 10^{-29}$ [kg/m³] or $9 \cdot 10^{-13}$ [J/m³]. Thus aether represents practically all energy of the Universe, and the substance is less than $1/10^{125}$ its parts, that their dividing difference is a square of Large Planck Number. It tells about balance, stationarity and eternity of the Universe.

According to research of the author the corpuscular aether is practically incompressible even under monstrous hydrostatic pressure existing in it

$$P_{E0} = kT_{E0}/V_a = 2.13 \cdot 10^{81} \text{ [Pa]} \quad (1)$$

where k - Boltzmann constant, T_{E0} - temperature of a space aether, V_a - volume of amer.

Thus variations of pressure of aether is a single reason of a gravitation, as it was thought by great thinkers of 17-th century Rene Descartes and Robert Hooke.

For understanding the quantitative-mathematical regularity of a gravitation, let's consider its qualitatively - logical fundamentals, that is the first causes.

Topology of the Gravitating Aether

" And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters"
[Genesis, The Creation, 6]

Follow to great Leonhard Euler started the basis of topology from bridges of Königsberg, we will try to begin physics of a gravitation from topology of aether, from bridges between corpuscular and phase aethers, between substance and antimatter.

So corpuscular ether represents by itself a pseudo-liquid of amers, collected in domains, peculiar drops. Each domain of free from substance aether, that is vacuum, contains $\sim 3 \cdot 10^{62}$ amers - the Large Planck Number. It corresponds to temperature of aether $T_{E0} = 2.7$ °K.

As was discovered by research of the author, fundamental particles of substance - protons and electrons, are domains of corpuscular aether. At birth of particle of substance on its surface (for an electron) or inside its volume (for a proton) arises and permanently performs a phase transition of amers of a phase aether into corpuscular, that is peculiar condensation. In an antimatter there is an inverse process - "evaporation" of amers that is a phase transition of amers of a corpuscular aether in a pseudo-gaseous phase ether.

Amer of phase aether have in 30 times greater volume, than amer of corpuscular aether, and radius greater in the cubic radical of Large Planck Number. Thus effective section of amer of phase aether is commensurable to size of ethereal domain and fundamental particles, and its "thickness" practically equals zero, that is $\sim 10^{-21}$ of corpuscular aether amer radius. Thus, the density of phase aether influences to a volume and pressure in aether very small, and the pressure of corpuscular aether influences on motion of phase aether very small. It is shown on the topological scheme of aether, fig. 1.

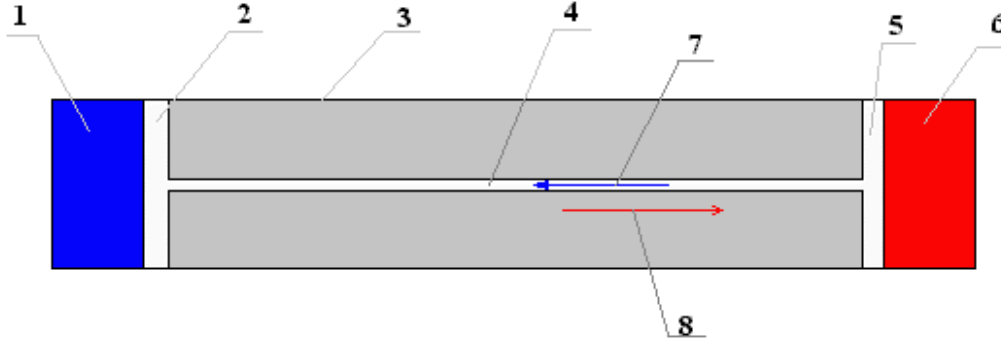


Fig. 1. The topological scheme of an ether.

1 - substance, 2 - place of condensation, 3 - corpuscular aether, 4 - phase aether, 5 - place of evaporation of aether, 6 - antimatter, 7 flow of phase aether, 8 - flow of corpuscular aether.

As is clarified by the author earlier, the condensation of phase aether during a gravitation has a speed

$$dN_g/dt = I_g = 2\pi c^2/h = c/(m_a \cdot r_a) = 8.52 \cdot 10^{50} \text{ [amer/kg s]} \quad (2)$$

c - is a speed of light, $h = 2 \cdot \pi \cdot c \cdot m_a \cdot r_a$ - is the Planck constant, m_a - is the Planck Mass (amereal inertia), r_a - is a radius of amer (the Planck Length).

That is the consumption - influx of amers for 10^{13} seconds = 317 thousand years makes 1 ethereal domain by a volume $\sim 10^{-45}$ [m³/kg]. Thus flows of aether caused by gravitation are so insignificant, that they it is not necessary to take it into account.

The single reason of gravitation is a pressure variation in aether caused by phase transition of amers at which their volume, as is clarified by the author, changes in 30 times. This volume is insignificant too, but aether is practically uncondensable. Its bulk modulus (Hooke modulus) $B = 6.34 \cdot 10^{82}$ [kg/ms²], and Poisson's constant differs from 0.5 on 10^{-33} only.

Force of Hooke in Aether

"Ut tensio sic vis"
- "Force is proportional to the tension"
Robert Hooke

Let's consider the formula of Hooke for process of all-round compression of a theoretically elastic liquid, what the aether is

$$P = B \Delta V / V \text{ [kg/ms}^2\text{]} \quad (3)$$

where P - is a pressure of all-round compression (or stretching), that is fluid pressure,
 B - is a bulk modulus (Hooke modulus)
 ΔV - is a change of a volume under action of pressure P ,
 V - the value of a volume, to which the force of compression is applied.

As the aether is under hyperpressure and is theoretically elastic, between additional pressure or rarefaction p_g , arisen in any point of aether, and change of its volume V_g in this point there is a strict linear dependence. Besides the relation of a potential energy of a relative strain/stretching of aether from average value (1) is linear

$$P_{E0} + p_g = B (\Delta V_{E0} + V_g) / V; \quad p_g = B V_g / V; \quad (4)$$

In this case volume V_g is a volume of "absolute emptiness", arising at the moment of phase transition of amers of a gaseous ether into amers of corpuscular aether, but real that "emptiness" is the sharp falling of the pressure at reduction of amer's volume during process of the phase transition.

Let's evaluate it for 1 kg of a gravitating body. From amers quantity subjecting to the phase transition (2) we can find

$$dV_g / dt = I_g \cdot V_a = 1.507 \cdot 10^{-53} \text{ [m}^3\text{/s]} \quad (5)$$

Knowing mean time of phase transition equal $t = 9.40 \cdot 10^{-14}$ [s], it is possible to find a volume of "absolute emptiness"

$$V_g = \Delta t \cdot dV_g / dt = 1.416 \cdot 10^{-66} \text{ [m}^3\text{/kg]} \quad (6)$$

Apparently, value (6) is completely insignificant and which is not being as against V in the formulas (2) and (3) dependent from radius of observation, (that is a radius of measurement) of a field of pressure outside of a body.

These reasons yield us a capability to present a function of pressure p_g in a manifestative kind from radius R (distance from a body) and created by amers phase transition the force of deformation $F_0(M)$, linearly dependent only from mass M , that is from speed of amers phase transition in a body

$$p_g = F_0(M) / (R + r_0(M))^3 \text{ [Pa]} \quad (7)$$

Besides it is possible to receive distribution of forces of deformation of an ether depending on deleting from a gravitating body with " by absolute vacuum " of effective section (cross-section) $r_0(M)^2$

$$F_g = E_0(M) r_0(M)^2 / (R + r_0(M))^3 \text{ [N]} \quad (8)$$

where $E_0(M)$ - is total energy of process of deformation of an ether under effect of mass M , that is gravitation.

Apparently, that from property of additivity of pressure, strain force and energy

$$E = \int \frac{dE}{dV} dV = \int p dV = \int p ds dr = \int F dr$$

Integrating (8) on all space it is possible to receive

$$\int_0^{\infty} F dr = \frac{E_0}{2} \quad (9)$$

Knowing quantitative parameters of aether it is possible to find a value $E_0(M)$. It appears equal Mc^2 . Apparently, that (9) is a potential energy of deformation of aether, and the second half of Mc^2 represents a kinetic energy of amers.

Celestial Bodies within Hooke's Gravitational Field

"True knowledge is a knowledge by causes"
Francis Bacon

From considered above becomes clear, that

- The measure of gravitation is the force of Hooke and variation of aethereal pressure, which in difference of Newtonian forces are additive and have cubic relation to radius;
- The energy of bodies in a gravitational field is less on many orders than energy of the gravitational field (for the Earth moving with speed 30 km/s on orbit this relation is 10^{-8}),
- The energy of substance Mc^2 actually is energy of aether, that is energy of a gravitational field created by gravitating bodies;
- The gravitating bodies does not interact with each other, not instantaneously, as Newton stated - "actio in distance", not with each other in curved space, as Einstein expected, but only with gravitational field existing in the given point *now and here*. For this reason in cosmic navigation "pasted together" trajectories are using for calculating a field for each instantaneous point.

Figuratively expressing, the celestial bodies are rolled as roulette balls in the funnel of a gravitational field, jumping up on knolls, "folds" induced by interaction of gravitational fields of several bodies. There is no mythical Newtonian centripetal gravitational force in the Nature, there is only Galilean inertial force, which is centrifugal concerning the given point of a trajectory, instead of "attracting" center. The Galilean inertial force is response to a bending of a trajectory by force of Hooke in aether.

Let's consider properties of Hookean gravitational field concretely.

In itself the decrease of pressure of aether has not an effect for motion of bodies in any way, just as the decrease of an air pressure has not an effect in any way for sailing vessel motion, being only a forerunner of a storm. As well as in aerohydrodynamics only a pressure gradient [Pa/m] has importance, which in case of atmosphere creates conditions origin of a wind, and in case of gravitation in aether creates conditions of origin of a local anisotropy of aether.

Hooke's field, being additive, can be written at once for many bodies, and not only for three bodies. In a case of spherical bodies of homogeneous density it is possible to write

$$Hooke(x, y) = \frac{3K}{4\pi} \sum_i \frac{M_i}{\max(R_i, r_i)^3} [Pa] \quad (10)$$

where K - is a physical dimensional factor, which we can fix as 1, using Planck's aethereal units, M_i - is a mass of i -th body, R_i - is a distance from i -th body up to a considered point, r_i - is a radius of a celestial body.

From (10) a vectorial pressure gradient playing a role of the operational force, similar to hydraulic pressure of Daniel Bernoulli receives trivially

$$Bernoulli(x, y, z) = \begin{pmatrix} \frac{\partial}{\partial x} Hooke(x, y, z) \\ \frac{\partial}{\partial y} Hooke(x, y, z) \\ \frac{\partial}{\partial z} Hooke(x, y, z) \end{pmatrix} [Pa/m] \quad (11)$$

As against (10) this value is vector and how it is easily to see is a function of the fourth degree of distance up to gravitating body. For it the hydraulic conditions of Bernoulli are equitable, that also it is easy to see, having constructed a conical tube of stream to a gravitating body.

For a flow of aether it is possible to make an equation of Leonhard Euler

$$Euler(x, y, z) = \frac{1}{\rho} grad(Bernoulli(x, y, z)) [m/s^2] \quad (12)$$

The expression (12) is precise value of acceleration of gravity, equitable not only in a case of single gravitating body, as by Newton, but for any quantity of celestial bodies.

The density ρ in eq. (12) is a value of inertia of aether in the given point and formally is determined by Poisson equation, though in light of our study, has absolutely other physical sense. Namely, it is a measure of an anisotropy and inertance of aether caused by presence of gravitating body, i. e. the density of gravitational field

$$\rho(x, y, z) = \frac{1}{4\pi} \begin{pmatrix} \frac{\partial^2}{\partial x^2} Hooke(x, y, z) \\ \frac{\partial^2}{\partial y^2} Hooke(x, y, z) \\ \frac{\partial^2}{\partial z^2} Hooke(x, y, z) \end{pmatrix} [kg / m^3] \quad (13)$$

Check-up the Theory of Aethereal Gravitation

In connection with additivity of a measure of Hooke, using the formulas (10-13) it is easy to construct distribution of gravitational field for several bodies and to see effects retrieved by Lagrange many years ago for particular cases, that is the points of libration. A map on fig. 2 shows the gravitation field distribution (12), where the Lagrange's points of libration L_4 and L_5 , being peculiar gravitational bins between two gravitating bodies are clear visible. In such bins are caught and there are planetoids, like Trojans and Greeks on orbit of Jupiter [28-30].

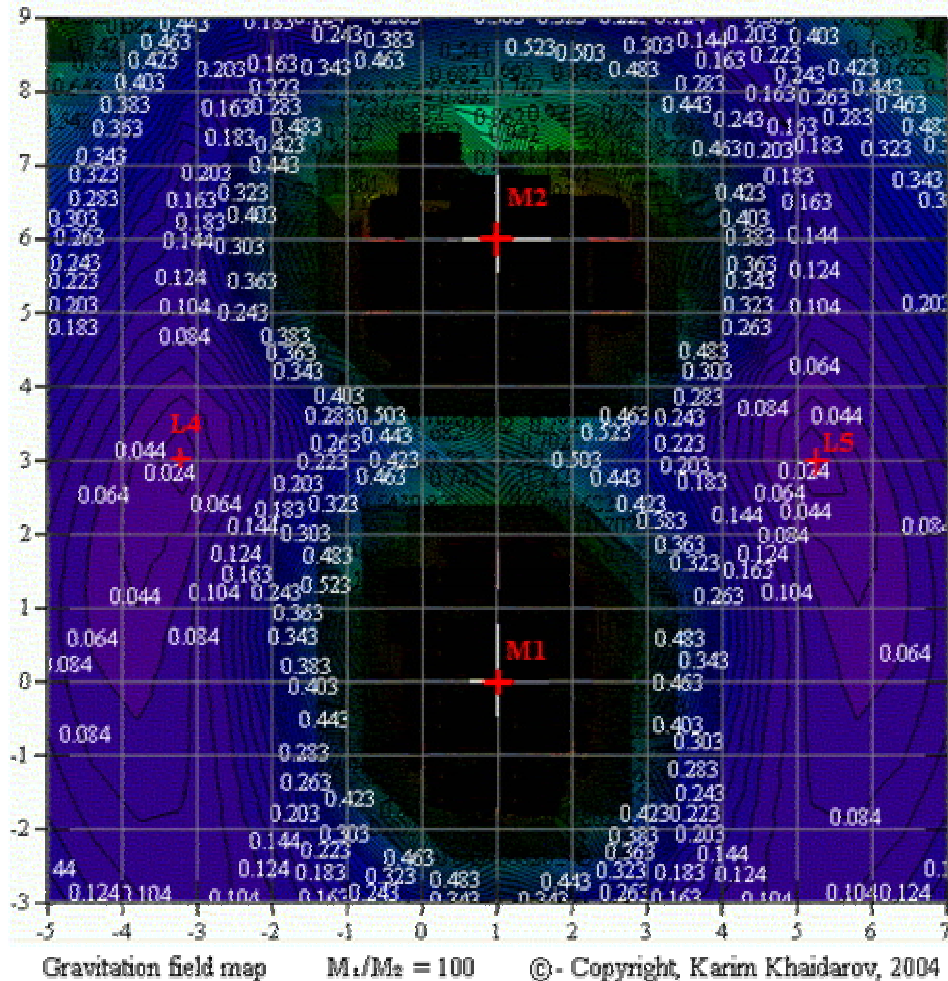


Fig. 2. The distribution of gravitational field of two bodies ($M_1/M_2 = 100$)

There is one more consequence of a rediscovered gravitation. The widescale cellular constitution of the Universe is determined by that the antimatter in essence can not be consolidated in celestial bodies in connection with its property of an antigravitation (repulse). As against usual substance as shown in a fig. 1 (also see paper [10]), in the antimatter there is not a condensation, but there is evaporation of amers of corpuscular aether, that is around of particles of the antimatter exists compression instead of rarefaction of aether. The particles of antimatter are repelled from each other and usual material.

"The Dark Matter" of the Universe is the antimatter, concentrated in intergalactic cells. Its quantity is apparently equal to mass of material of galaxies, but it is scattered. The antimatter is the supplier of a phase aether for process of a gravitation of the material.

Conclusions

On the basis of classical works of Robert Hooke, Daniel Bernoulli and Leonhard Euler, as a result of the research, made by the author, the actual nature of gravitation is clarified:

- The gravitational field is a field of pressure in aether according to Hooke's Law.
- The gravitational field is an additive function of a cube of radius of distance from a celestial body.
- The gravitational field, that is potential energy of deformation of an ether + amers kinetic energy, is a receptacle of energy of mass - Mc^2 .
- The Newtonian celestial mechanics takes place only for trial bodies in a gravitational field of one heavy body and no more.
- The centripetal force of a gravitation, introduced by Isaac Newton is an artifact; substantially there is only Galilean inertial force and centrifugal force, induced by it directional in backward from local center of a trace curvature.
- The balance of forces in motion of a celestial body is determined by balance of Galilean centrifugal force of inertia with force generated by a local pressure gradient of aether according to Euler's hydrodynamic equation.
- The gravitational force in general case of many bodies is not central.
- The many-body problem is decided trivially in the theory of aether by toting of deformation fields.
- The gravitational interaction contrary to crazy fabrications of relativistic physics is the most strong and basic of all physical interactions, and all remaining are second and third order effects of motions in aether.

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Almaty, December 31, 2004