

Antigravitation in the Universe

Rykov A.V.¹

The physical vacuum is environment determining a gravitation and an antigravitation in the Universe. The inertia is a property of masses having a gravitational electrical charge, on which the electrical field acts with force, proportional acceleration of a charge. These main features enables to evaluate operation of antigravitational accelerations on space objects. The brief analysis of an antigravitation in a solar system, for the Universe as a whole is conducted. The problems for definition of acceleration are put, at which it is possible to speak about explosive character of motion, and determination of the actual size "of a black holes" at specific size of a gravitational charge.

In behave of GTR, RTG and quantum theories in physics the scripts of an arise of the Universe from the moment of Large Explosion are well known. Theoretical physics, most appropriate to state -of-the-art, it is accepted to consider the inflationary theory of origin of the Universe. In it the basis the submission about «false» physical vacuum (PV), deprived matter is necessary. The special quantum condition PV, deprived matter, has resulted in explosion and birth in a consequence of a matter. That accuracy is most surprising, from which there was an act of birth of the Universe: «... If in an instant appropriate 1 sec..... the speed of the extension would differ from the actual value more than on 10^{-18} , it would appear rather for full destruction of thin balance" [1]. However, the key feature of explosive birth of the Universe consists in strange a combination of a repulsion and gravitation. "It is easy to show, that the effects of a space repulsion can be attributed to account of a usual gravitation, if as a source of a gravitational field to select environment with exotic properties.... The space repulsion is similar to behavior of environment with negative pressure" [1]. This notion is extremely important not only in problems of a cosmology, astrophysics, but also in general in physics. In papers [2,3] a space repulsion or the antigravitation has received natural explanation based on the so-called United Law of a Newton - of the Coulomb (of a Nature - ULN). It means natural connection between a gravitation and inertia of a Newton, interactions of electrical charges and magnetic masses of the Coulomb. Briefly this connection, expresses by the formulas:

$$q = \rho m, \rho = -8,614741 \cdot 10^{-11} \left[\frac{a s}{kg} \right], M = 29,97924 [Om]q \quad (1)$$

Where:

q - gravitational electrical charge of mass, m - mass of a body, M - magnetic mass.

The value of a coupling coefficient between mass and charge is determined from a ratio of gravitational and electrical constants PV [2, 3]. A major property PV is it weak electrical charging, due to which there is a gravitation at the presence of a matter and antigravitation (negative pressure, a Colombian repulsion) in absence of a matter or in case of its separation into space distances.

Because of data of submissions the count of a general charge of the Universe is made:

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Anatolij Vasil'evich Rykov, Head of Seismometry & Engineering Seismology Lab
United Institute of Physics of the Earth, Moscow, Russia. E-mail: rykov@upei-ras.scgis.ru

$$Q = -5.8040 \times 10^{42} \text{ Coulomb} \quad (2)$$

The sign of a charge is defined by sign of a magnetic field of the Earth, which is determined by a negative electrical charge of mass of the Earth making 24 hours rotary motion. By the way, the count of strength of a magnetic field along rotation axis has given size 37 a/m at actual strength on magnetic poles on the average 50 a/m. The general charge of the Universe corresponds to density 1,608 g/sm³, that coincides under the order of value in the theory RTG. The adduced data ULN confirm consistency it of main feature of conventional physics. Concept of inertia in ULN is given below. It expresses by the formula:

$$\text{The force of inertia is } F = -q \frac{\ddot{x}}{\rho} [\text{kg ms}^{-2}], \text{ where } \ddot{x} - \text{acceleration of a mass.} \quad (3)$$

Any electrical charge moved with acceleration, experiences a force of resistance equivalent to usual force of inertia. For detection of effect of an antigravitation, which carrier is electrical charged PV, we shall calculate modern density of a charge of space:

$$\rho_U = Q / \left(\frac{4}{3} \pi R_U^3 \right) = -1,3846 \cdot 10^{-26} [q m^{-3}] \quad (4)$$

From the formula of interaction of charges of the Coulomb we have a potential and electrical voltage:

$$U = \xi \frac{q}{R}, \quad E = \frac{1}{R} U \quad (5)$$

Where:

$\xi = 1/\epsilon$ - electrical constant, return size of a dielectric permeability PV,

R - distance of a point on distance of a potential and electrical field from a charge.

Under the formula (3) is defined acceleration of a self-repulsion (acceleration of an antigravitation):

$$G = \ddot{x} = \rho E = \rho \xi \frac{q}{R^2} \quad (6)$$

Accordingly charge of some volume of the spherical form with a radius R :

$$q = \frac{4}{3} \pi R^3 \rho_U \quad (7)$$

Where:

ρ_U - density of an electrical charge of object (for example, Universe)

By making all substitutions, we shall receive acceleration of a repulsion:

$$G = \sqrt{\gamma} \xi \frac{Q}{R_U^3} R \quad \text{Or in other form } G = E_\sigma \frac{Q}{R_U^3} R \quad (8)$$

Where:

E_σ - PV parameter, $R_U \approx 10^{26} m$ - radius of the Universe adopted now (are visible quasars).

Formulas (8) for definition of acceleration of forces of an antigravitation include a constant of gravitation of a Newton. Therefore there is nothing mysterious or surprising that the act of Large Explosion was executed with huge accuracy of balance of a gravitation and antigravitation.

The substitution of all known sizes gives:

$$G = -8.9875 \cdot 10^{-10} [ms^{-2}] \quad (9)$$

We have now the tool for an evaluation of a self-repulsion of any space object. The appropriate data for a solar system are obtained.

For convenience of the review they are adduced in table 1:

№	Planet	Acceleration g on a planet ms ⁻²	Acceleration of a repulsion on a planet G, ms ⁻²	Acceleration of the Sun gs in a point of a planet ms ⁻²	The relation gs/G	The relation G/g
1	2	3	4	5	6	7
1	Mercury	3.33	-0.0022	0.0395	17.6818	6.6066e-4
2	Venus	8.52	-0.0056	0.0113	2.0179	6.5728e-4
3	The Earth	9.806169	-0.0057	0.0059 a = 0.0057- p = -0.0061	1.0351 1 - 0702	5.8127e-4
4	Mars	3.77	-0.0030	0.0026	0.8667	7.9576e-4
5	Jupiter	25.10	-0.0641	0.00021885	0.0034	0.0026
6	Saturn	5.688	-0.0535	0.000065077	0.0012	0.0094
7	Uranus	8.83	-0.0231	0.000016085	6.9632e-4	0.0026
8	Neptune	11.00	-0.0224	0.0000065515	2.9248e-004	0.0020

Have received curious parameters of a Solar system. The Earth takes a «especial» position among planets of earth group. The force of a vacuum repulsion «is compensated» by force of solar attraction. And full compensation comes in aphelion (and = 0.0057). The relation of accelerations of a solar origin on the Earth and vacuum repulsion about accuracy 3 % is equal to 1 for mean deleting of the Earth from the Sun (column 6). The planet a Mars is close to the given parameter. The Mars appears to be the closest on many parameters to the Earth (difference from 1 for a Mars makes 13 %). In the «worse» position there is a Venus (relation = 2) and, especially, Mercury - 17,7. Probably, any image this parameters connected to physical conditions of existence of planets. The group of planets of the Jupiter sharply differs under the indicated relation from earth group of planets (parameter of a column 6 from 0,0012 up to 0,00029248). In 7 columns the relation of accelerations of a repulsion to accelerations of gravity are adduced that for earth group of planets it is of one order, is rather small number and makes approximately 0,00066. For group of planets - giants this parameters 100 times more, that, probably, determines an essential difference in planets of both groups. Thus, the sizes and structure of planets appear determining in ratios of accelerations of gravity and antigravitation for planets of a solar system.

Let's deliver a problem of an evaluation of initial acceleration of a repulsion at the inflationary extension of the Universe. The inflationary theory is based on the entry condition of existence of physical vacuum without «matter». In a similar condition the vacuum experiences maximum a Colombian repulsion and it the extension is characterized by large sizes negative acceleration. According to a conservation law of a charge at a Universe modern radius $R = R_U^3 \approx 10^{26}$ the acceleration is calculated under the formula:

$$G = -E_{\sigma} \frac{Q}{R_U^3} R = -E_{\sigma} \frac{Q}{R_U^2} = -4,4938 \cdot 10^{-10} \text{ mc}^{-2}. \quad (10)$$

The acceleration is insignificant a little. Actually state of our Universe is stationary, than extending with acceleration. At the moment of origin the Universe had mesh sizes, the huge electrical charge was concentrated in small volume. Let's make an evaluation of acceleration for an initial moment of birth.

$$G = -E_{\sigma} \frac{Q}{R_{inU}^2} \quad (11)$$

Setting a radius of the Universe R_{inU} , we shall receive initial acceleration at Large Explosion. For example, for a radius 1 м the acceleration at Large Explosion will be $4,4938 \cdot 10^{42} \text{ ms}^{-2}$. The time of accelerated motion T from zero speed to be defined probably according to a postulate Einstein with maximum speed $3 \cdot 10^8 \text{ ms}^{-1}$ of motion of a matter. From here $T = \frac{3 \cdot 10^8}{4,4938 \cdot 10^{42}} = 6,6759 \cdot 10^{-35} \text{ s}$. This evaluation gives submission about size of acceleration in period T, above mentioned for the initial Universe with a radius 1 м. As the initial size is selected arbitrary, it is useful to construct the graph of relation of time T from the size R_{inU} of the Universe. The formula of calculation:

$$T = \frac{cP}{\gamma Q} R_{inU}^2 = 6,6759 \cdot 10^{-35} R_{inU}^2 \text{ sec.} \quad (12)$$

The schedule for radiuses in range 1 - 1000 м is adduced on fig.1. That the acceleration is characterized by explosive character of the extension of the Universe is outside of any doubt. However, the general picture of the initial Universe in theoretical physics based on quantum theories and the theory of a structure of matter, has in view of existence of a singularity, i.e. mathematical point, from which «inhault» there was a lot of a matter. The first significant time of birth is a Plank time 10^{-43} seconds. In our case for Plank time the «mathematical» point finds the size defined by the radius $R = 3,87 \cdot 10^{-5} \text{ м}$. In any case the quantum theories in ULN would default of that basic role,

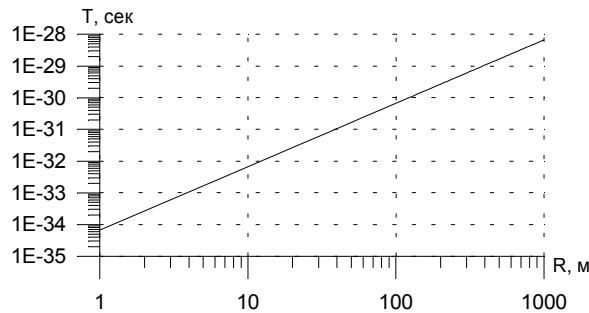


Рис.1 Relation T from R.

which is necessary in the conventional cosmology. In ULN the explosive character of birth of the Universe will be and for time T of the order 1 sec. The appropriate acceleration is equal $2,9979 \cdot 10^{18} \text{ m/s}^{-2}$, and the radius of the order $1,2239 \cdot 10^{17} \text{ м}$ (approximately in 70 times is less than our galaxy). It is enough of these entry conditions for explosive character of the Universe. The «black superhole» is satisfactory on the size for it and the concept of a singularity is not required. The real entry conditions should be investigated in addition. The problem consists in finding -

out of a capability of existence "of a black hole" with maximum allowed density. The connection of maximum density with a radius "of a black hole" is established by [2, 3]:

$$\rho_{\max} = 1,3856 \cdot 10^{16} \frac{1}{R_g^2} [q m^{-3}] \quad (13)$$

On the other hand we matter of a general charge. From here density of the Universe as "of a black hole" and it the size would be:

$$1,3856 \cdot 10^{16} \frac{1}{R_g^2} = \frac{3Q}{4\pi R_g^3} \quad R_g = \frac{3Q}{4\pi 1,3856 \cdot 10^{16}} = 10^{26} \text{ м} \quad (14)$$

The size of a radius of an initial black hole appears to be equal 10^{26} м . The Universe on is less that and it falls out of category of usual "black holes", having density of a charge on 10 oder more then usual "of a black hole" and being thus "by a black superhole". Let's evaluate a maximum radius "of a black hole" at a general electrical charge. The black hole is characterisieted by that the second space speed exceeds or is equal according to a Einstein postulate of speed of light. Let's receive the formula for an evaluation of a radius of similar object:

$$R_g = 2E_{\sigma} Q \frac{1}{V^2} = 10^{26} \text{ м} \quad (15)$$

Outcome is paradoxical and coincides with a Schwarzschild's radius. Our Universe, outside of any doubt, is «a black superhole» for the probable external worlds: it the radius falls in range of the sizes allowed for similar objects

of space - from 10^{-36} up to $3 \cdot 10^{35}$ m! There is a natural problem: at what acceleration of the extension of the Universe it is possible to consider in a condition of explosion? Only by answering this problem, it is possible really to evaluate a moment of birth and initial size. At reaching of the size $3 \cdot 10^{35}$ m, if the Universe will not begin to contract earlier, it will become accessible for contacts and observations on the part of other same opened Universes, as the electromagnetic signal can outcome. The radius 10^{-36} m also looks realistic only for the mathematical description. The similar situation could be avoided, if Einstein postulate for boundary PV and for real empty space, in which it is impossible to transmit any physical interactions, is incorrect. Unlimited on speed the extension PV in vacuum is capable sharply to limit the indicated range of the sizes of a radius of the Universe at any moment of its life, by giving cosmologies more realistic outlines.

Conclusions

1. Finds confirmation of ULN conceptions in main cosmological view of the conventional astrophysics.
2. The evaluation of effects of an antigravitation of physical vacuum on examples of a solar system and Universe is conducted. The Earth takes the special among planets under precisely compensation of a local repulsion and solar attraction.
3. The natural conclusion about a general source (PV) of a gravitation and antigravitation determining accuracy of parameters of Large Explosion is obtained.
4. The Universe is "a black superhole".

Reference

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