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Dynamic Parameters of The Space Environment (Space Ether's Dynamics)

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Abstract

This paper presents a new dynamic approach to studies of the space environment. The author has explored a mechanism to produce vortex flows of muons and π-mesons in the space, their stability at superlight velocities. It submits numerical values of parameters for the ether's dynamic space environment and presents more details for the principle of mass equivalence.

Keywords: neo-ether, ether's dynamics, dipole, medium density, pressure, temperature, dynamic viscosity, kinematic viscosity, muon, π-meson, Reynolds number, equivalence of mass equivalence, Roche limit

Today, science has irrefutable arguments to say that a concept of the space environment goes far beyond a concept of the physical vacuum. Within a standard model, recent astronomical observations made by Chinese scientists [1] have not found their explanation. From the perspective of the general relativity theory, it is impossible to explain anisotropy of three-degree background thermal radiation [2] discovered by American scientists from the NASA. A nature of superluminal radiation by N. Kozyrev also has remained a mystery, as well as of torsion radiation by G. Shipov [3]. We need a new approach to assessing a role of the space environment in dynamics of celestial bodies and its nature.

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The neo-ether theory by A. Rykov [6], where electron-positron dipoles form a gas-alike medium, allows applying laws of hydro and aerodynamics for a preliminary numerical calculation of its dynamic parameters. There are medium density, pressure, temperature, dynamic viscosity,

kinematic viscosity, and other gas-dynamic parameters. Comparing estimates for planets' motion in neo-ether, got with their help, with results of astronomical observations, one can better understand a nature of the universe laws. As anobject to be observed, let's choose two planets within the Solar System, our Earth rotating along its stationary orbit around the Sun, and the Mercury, the orbit of which is subject to strong perturbations due to a close location of the planet to the gravity centre. Along with their orbital motion around the Sun, planets, together with the entire Solar System, are moving toward the centre of the Galaxy. At the same time, a spiral motion of planets in the space forms a toroid. As a planet is moving in the space environment, a toroidal spiral vortex is blowing from its mid – its central channel – a spiral flow of the ether. A progressive motion of the flow is converted into a toroidal motion of the ether around the planet.

This motion follows the Biot-Savart law and extends to an area of the space quite remote from the planet [4]. As a central channel of a celestial body is not always oriented towards the Earth, the radiation, found by N. Kozyrev, is difficult to be reproduced. [3]. A rotational motion of the planet follows ether-dynamics laws. In case of a toroidal motion, one volume of the ether involves another by exposing it to a direct pressure, while in case of a ring motion neighbour layers are involved due to the ether's viscosity. This is a cause for the toroidal motion that will cover the entire surrounding environment, while the ring motion may have two conditions. One covers the surrounding area and another one is localized within a certain boundary layer. A location of planets close to a spherical form facilitates numerical assessments of an impact of the space environment on their motion. At that, it is necessary to take into account polarization of the ether next to massive celestial bodies that leads to appearance of extra ethereal atmosphere around planets. Such extra ethereal atmosphere rotates together with the planet. [6] This allows us to standardize calculations of dynamic parameters for the neo-ether and proceed to considerations of a structural element of the space environment, i.e. π-meson (muon), made with a cluster of 137 dipoles of virtual pairs: electron + positron as a trial sphere. [6]

1. Ether density - ϱ [kg · m⁻³]

Rotation of a structural element of the ether with r radius produces a rotation field around π-meson. Mechanical energy of a velocity field with constant ether's density is [5]:

$$Wv = 2\pi\varrho v^2 r^3 \qquad (1)$$

where ϱ is ether's density,
r is a π-meson radius,
v is a motion velocity of ether's structural elements.

For π-meson with q charge, electric energy We is [5]:

$$We = \frac{q^2}{8\pi\varepsilon_0 \varepsilon r}$$

(2)

where ε_0 is the electric constant,
ε is relative permittivity.

Having compared formulae for mechanical energy of the velocity field Wv (1) with electric energy of the field for π-meson charge We (2), we have:

$$2\pi\varrho v^2 r^3 = \frac{q^2}{8\pi\varepsilon_0 \varepsilon r}$$

(3)

Hence,

$$v = \frac{q}{4\pi r\sqrt{\varepsilon_0\varepsilon\varrho}} \qquad (4)$$

From the equation (4) we have found that

$$\varrho\,(v \cdot S)^2 = \varepsilon_0\varepsilon\left(\frac{q}{\varepsilon_0\varepsilon}\right)^2 \qquad (5)$$

S is a sphere surface for π-meson, around v velocity.

Thus, values $\varepsilon o \varepsilon$ and q in formula (5) receive their simple interpretation:

$\varepsilon o \varepsilon$ corresponds to ϱ,
q corresponds to $\varrho \cdot v \cdot S$,

Where dielectric permittivity is the ether's density, while a charge is a surface circulation of ether's rings [5].

$$\varrho = 8.85 \cdot 10^{-12}\ kg/m^3$$

2. Ether's pressure - P $[n \cdot m^{-2}]$.

To determine the ether's pressure (P) let us apply a ratio of a photoelectric effect for the ether [6]. A photon with energy W=1 MeV =$1.6 \cdot 10^{-13}$Joule turns into a pair electron-positron, i.e. the photon destroys a dipole structure in the ether. At the same time, limit deformation of dr dipole, with which an interaction between a virtual electron and positron in the dipole reduces to zero, is dr=$1.02 \cdot 10^{-17}$. Hence, a force arising from the electron separated from the positron,

$$F = \frac{dW}{dr} \quad F = 1.6 \cdot 10^4 N \tag{6}$$

As for π-meson of the space ether, it has a looser structure than a nuclear one, To a first approximation, we can take its area size equal to the area of a dipole cross section $Sd=\pi r^2$, where $r=1,4 \cdot 10^{-15}$ m is a structural element of the cosmic ether, equal to a distance between centres of a pair of charges in the dipole [6]. Hence, the pressure in the ether will be

$$P = \frac{F}{S} \quad P = 0,2 \cdot 10^{34}\ N \cdot m^{-2}$$

(7)

3. Speed of ether's structural elements - V $[m \cdot s^{-1}]$.

A motion speed of π-meson in the ether can be determined from formula (4)

$v = e/4\pi r^2 \varrho$, $\quad v=3 \cdot 10^{21}\ m \cdot s^{-1}$, where e is π-meson charge, $e = 1.6 \cdot 10^{-19}$ kl

r is radius of the ether's π-meson, $r=1.4 \cdot 10^{-15}$ m
ϱ is the ether's density, $\varrho=8.85 \cdot 10^{-12}$ kg/m³

4. Ether's dynamic viscosity - η [$n \cdot m^{-1} \cdot s^{-1}$]

Dynamic viscosity (internal friction coefficient) η can be found from the Newton's equation [5]

$$dF = \eta \cdot \left(\frac{dv}{dx}\right) \cdot dS \qquad \eta = P \cdot \frac{dr}{dv} \tag{8}$$

where: dr is dipole limit deformation,

v is a relative velocity of ether's structural units,
P is ether's pressure

The ether's dynamic viscosity $\eta=6 \cdot 10^{-6}$ $n \cdot m^{-1} \cdot s^{-1}$

5. Kinematic viscosity [$m^2 \cdot s^{-1}$]

Kinematic viscosity χ equals to a ratio of dynamic viscosity (η) to ether's density (ϱ)

$$\chi = \frac{\eta}{p} \qquad \chi = 7 \cdot 10^5 \tag{9}$$

8. Temperature of the space ether – T

The temperature of the space ether was found in 1965 by A. Penzias and R. Wilson while making measurements for background radiation of the space environment in a microwave range 10GHz-33 GHz and equals to T=2.7 degrees Kelvin [2]. A value of the ether's temperature obtained from astronomical observations, T = 2.7 K, is significantly higher than the temperature obtained with calculations based on gas representations $T=7 \cdot 10^{-51}$ K. This suggests that the space environment cannot be in full compared with the gas. There are electro-dynamic processes described with solutions of equations within the Unitary Quantum Theory by Professor L. Sapogin [9].

Now it is possible to assess sustainability of the space environment, in particular its structural elements.

It should be noted that according to certain data, besides π-mesons muons may act as structural elements of the space ether, while π-mesons in nuclear and nucleon ether. Under experimental conditions, with V<C these particles are unstable; an average lifetime of a muon is 10^{-6} s, while of a π-meson is 10^{-8} s. However, from experiments we have established that with increasing velocity of particles their lifetime also increases.

There is a dependence between a nature of structural elements making a gaseous or liquid medium and the Reynolds number. In this regard, it would be interesting to determine the Reynolds number that characterizes a muon (π-meson) behaviour in the space ether. [5]. A particle diameter is a value of about d (1.3-1.4)$\cdot 10^{-15}$ m, which can be taken as an indicative size. A motion speed of structural elements around a muon (π-meson) is about $3\cdot 10^{21} m\cdot s^{-1}$. Taking that into account, kinematic viscosity of the ether $\chi=7\cdot 10^{5}$ $m^2\cdot s^{-1}$, we find Re

$$Re = \frac{v\cdot d}{\chi} \quad Re = 6 \tag{10}$$

The theory of liquids and gases recognises a statement that vortices start appearing when the Reynolds number is over 1000. Hence, a muon (π-meson) in the near Earth's ether can be regarded as a stable vortex entity in the space environment with an established structure, which does not depend on either initial or edge conditions available in time of its appearance.

Having defined ether's dynamic parameters of the space environment and its stability, one can analyse some specifics of Kepler-Newton's celestial mechanics. In particular, a difference in a value of the Kepler constant for the Mercury (K=3.33) and terrestrial planets (K = 3.35).

The ancestor of celestial mechanics J. Kepler in the early 17th century, based on multi-year astronomical observations by Tycho Breguet, established empirically three laws of planetary motion relative to the Sun.

Unless evolutionary processes in the Solar System disturb stability of planets' rotation, these laws would not change.

Kepler's third law states, "The ratio of period squares of any two planets is a ratio of cubes of their large semi-axes of elliptical orbits, along which they rotate around a central body." [7]. This implies that the ratio of the cube of the orbit radius to the square of the orbit time of the planet is constant

$$K = \frac{R^3}{T^2} \qquad (11)$$

where K is Kepler's constant.

Kepler calculated K values for all planets known to him in the Solar System:

$$K = (3.33 - 3.35)10^{24}\ km^3 \cdot year^{-2}$$

Half a century after Kepler, Newton introduced forces into the spatial model of the universe [7]. The space of the universe produces gravity and inertia forces acting following quadratic laws of interaction between bodies (laws by Coulomb and Cavendish). Having articulated his laws of dynamics and universal gravitation, Newton got Kepler's third law as consequence of the universal gravitation law and the second law of dynamics as follows:

$$K = GM\frac{m\ gr.}{m\ in.} = \frac{R^3}{T^2}. \qquad (12)$$

Where

m gr. is the planet gravitational mass, interacting with the Sun, the M mass, produces a centripetal force of gravity;
m in. is the inertial mass of the planet. It is rotating around a circle of R radius and producing a centrifugal force of repulsion,
R is a distance from the centre of the planet to the centre of the Sun,
T is a period of the planet rotation around the Sun,
G is the gravitational constant.

In time of planets' motion along their stationary orbits, resistance of the space environment almost only depends on friction forces. Classical physics to describe such a motion applies the Stokes' law.

Stokes found that the resistance force in this case is proportional to dynamic viscosity coefficient η, velocity of a body in relation to V environment, and a distinctive size of a body L: F ~ u v L.

The proportionality factor depends on a shape of a body. For a sphere, if as a radius L we take a radius of the sphere r, then the proportionality factor is equal to 6π [4]. Hence, the force of resistance to the motion of the sphere in the medium (ether), in accordance with the Stokes' formula, is:

$$F = 6\pi \eta r v \quad (13)$$

In case of a non-equilibrium state of the system, a speed of a body increases, its vector is constantly changing, there are vortices appearing behind the body. At the same time, an energy of vortices is actively influencing the system "from the outside" (from a side of the environment). Pressure in a vortex area formed behind the body, will be reduced, so the resultant of pressure forces will be non-zero, determining in its turn any resistance. As a result, frontal resistance consists of frictional resistance and pressure resistance.

The ratio between the frictional resistance and the pressure resistance depends on the Reynolds number (Re). The more Re is, the more a role of pressure resistance is. Hence, a transition of the system from a stable state to an unstable one, its non-equilibrium state, would be accompanied with a growth of ether's vortices. The growth would counteract a change to the state of the system, i.e. generating an additional field of inertia, which is stronger, when the greater disturbance influences the environment [4]. Having known orbital velocities of the Mercury and

the Earth in the Solar System and planets' radii, let us calculate the friction force based on the Stokes' law (13).

Mercury' speed $V_m = 7.5 \cdot 10^4$ m $\cdot$ s^{-1}. Mercury' radius $R_m = 2.5 \cdot 10^6$m [7]

Earth's velocity $V_e = 3 \cdot 10^4$ m $\cdot$ s^{-1} . Earth's radius $R_e = 6.3 \cdot 10^6$m [7]

$Fm = 6 \cdot (3.14) \cdot (7.5 \cdot 10^4) \cdot (2.5 \cdot 10^6) \cdot (10 \cdot 6^{-6}) = 21 \cdot 10^6$ N.

$Fe = 6 \cdot (3.14) \cdot (3 \cdot 10^4) \cdot (6.3 \cdot 10^6) \cdot (10 \cdot 6^{-6}) = 30 \cdot 10^6$ N

Let us define the energy, spent by the Earth to overcome the ether's friction per second of orbital motion $Efr = Fe \cdot Ve$, $Efr = 9 \cdot 10^{11}$ J. One can compare this energy with a tidal deceleration of the Earth by the Moon per second $Etd = 25 \cdot 10^{11}$ J. As can be seen from a comparison of Efr and Etd, the energy of the Earth's deceleration with the ether is 35% of the energy of the Moon's deceleration of the Earth, while a contribution of the Moon tide does not exceed 1% in the total Earth's energy [10].

Results of calculations show that in case of an equilibrium nature of planets motion along their orbits, the resistance force for the Mercury and the Earth are of the same order, but in case of strong disturbances imposed by the Sun on a trajectory of Mercury's motion, the picture changes. Let us pay attention to a difference in a value of the Kepler constant K for terrestrial planets, such as the Venus, the Earth, the Mars, rotating along stable, seldom-perturbed orbits, for which value K = 3.35, and the Mercury, the orbit of which is subject to strong perturbations due its close location to the Sun. For the Mercury, value K is 3.33, that is 1% less than that for planets with stable orbits. Perhaps, this results from vortex ether-dynamic forces in the space environment responding to its perturbation by the Mercury. At the same time, the inertial field increases and because a value of K depends on the ratio of masses, gravitational to inertial (12), we can conclude about a growth of the inertial mass of the Mercury.

The equivalence principle stated by Einstein based on numerous experiments by R. von Eötvös, who had found that under the Earth's conditions the inertial mass and gravitational mass were always equal, requires clarification. [8]

An example of the Mercury shows that for none-equilibrium systems, a difference of the inertial mass from the gravitational mass can reach 1%. As far as in the Solar System the Mercury is the closest planet to the centre of gravity, we can assume that violating the principle of equivalence by more than 1% leads to irreversible consequences and the system becomes unsustainable. In astronomy, this minimum radius of a circular orbit, where a satellite is not destroyed, was called the Roche limit [7].

Einstein's paper, in which he had tried to explain the motion of Mercury's perihelion from a standpoint of the general relativity theory and seemingly achieved remarkable results, has turned to be wrong.

Member of Academy Hua Di found that calculating the integral, Einstein had made a mistake with fatal consequences, as results of repeated calculations turned to be very distinctive from results of multi-year astronomical observations of the Mercury's motion [1].

Quite a curious case when, having made an error, A. Einstein got a correct result, saying that "in one turn of a planet, its orbit rotates by a part of a complete turn-around, equal to fractions $d=3\cdot v^2/c^2$, where v is orbital velocity of the planet." Within the accuracy of one arc second, this result meets astronomical observations. [8] There is a link between the ratio obtained by A. Einstein, Kepler constant (K) and the ether. Inserting a value of an average speed of a planet orbital rotation $v = 2\pi R/T$ into the expression for the Kepler constant (11), we would obtain:

$$v^2 = \frac{K}{R} \tag{14}$$

Then, the Einstein relation would have the following form:

$$d = \frac{3K}{RC^2} \tag{15}$$

This means that a value of orbital change will be inversely proportional to the radius of the planet and the squared velocity of both motion of the planet, and the entire Solar System relative to immovable ether ($C= 380\cdot 10^3\ m\cdot s^{-1}$). To conclude with, I would like to thank Professor L. G. Sapogin from Moscow State Automobile and Road Technical University for his priceless support and help.

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