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Basic of the graviacoustic light theory

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ABSTRACT

A non-electromagnetic theory of light is proposed, according to which the light-bearing medium is non-baryonic (unstructured) matter as the main component of the substance of the universe. The theory is based on available data on the existence in the intergalactic medium of closed density waves, which are combined into structural elements (particles) of baryonic matter. On the basis of the principle of the equivalence of mass and energy, and also of the theory of waves, the basic relations between the parameters of non-baryonic matter are derived and the possibility of the appearance of running waves in it that make it visible is shown. The unity of the properties of non-baryonic matter with ether is emphasized, and the absence in the theory of contradictions inherent in the electromagnetic concept of light. Experimental evidence of the proposed theory is presented and new approaches to a number of difficultly explainable phenomena, including levitation, are discussed.

Keywords: Universe, non-baryonic matter, energy, gravitational interaction, closed waves, processes of structure formation, baryonic matter, radiation, traveling waves, levitation

1. INTRODUCTION

In a number of our previous articles summarized in [1], we have shown the inconsistency of the electromagnetic theory of light of Maxwell, beginning with the contradictory nature of the postulates underlying them, and ending with its inconsistency with a number of new experimental data. This position received unexpected reinforcement in astrophysics, where at the turn of the 20th and 21st centuries it was discovered that at least 95% of the mass of the entire universe belongs to non-baryonic matter [2..5], which does not participate in electromagnetic interactions. This circumstance compels us to reconsider the

electromagnetic concept of light, if only because in the "dark" regions of the universe, where the fraction of non-baryonic matter is close to 100%, there simply does not remain a place for either the electromagnetic field or any other hypothetical light carriers claiming materiality. This means that the carrier of radiation is the same environment from which all kinds of matter of the Universe were formed. Disagreeing with this reader, it is useful to recall the words of Maxwell himself: "One must not lose sight of the fact that we have done only one step in the theory of the action of the luminiferous medium. We suggested that it is in a state of tension, but did not completely explain what kind of tension it is and how it is maintained "[6]. The answer to this question is the present article.

2. GRAVIDYNAMIC POTENTIAL OF NON-BARYONIC MATTER

Considering the universe as a whole as an object of investigation, we will understand by it "all things", i.e. The whole set of interacting (mutually moving "material bodies.") Such a system is by definition isolated, and for it the usual notions of the external environment and external energy (kinetic and potential) are meaningless. All of its energy U is internal, and it is to it that the known law of its conservation applies. The fact that non-baryonic matter participates only in the gravitational interaction and makes up at least 95% of the mass of the universe forces us to consider the gravitational component U_g of this energy as its original form, from which all other forms of it evolved. This circumstance requires a revision of many existing concepts, including the attribution of gravity to the weakest of all known types of interaction. Indeed, in accordance with the principle of equivalence of the mass M and energy U , which is valid for any of its forms, the following relation is also applicable for the gravitational energy U_g :

$$U_g = M_g c^2. \quad (1)$$

It follows that the gravitational potential $\Psi_g = \partial U_g / \partial M_g$ as the specific value of the gravitational force \mathbf{F}_g is equal to the square of the propagation velocity of the disturbance in the intergalactic medium (ie, the speed of light):

$$\Psi_g = c^2. \quad (2)$$

This quantity is many orders of magnitude greater than the gravitational potential ψ_g found on the basis of Newton's law of gravitation $\psi_g = GM/R$, if we assume it to be, just like Ψ_g , strictly positive. In particular, for a Sun with a mass $M_c = 1.989 \cdot 10^{30}$ kg and a radius $R_c = 6.9599 \cdot 10^8$ m (where this potential is maximal), at $G = 6.672 \cdot 10^{-11}$ [H·m²·kg²], the potential ψ_g is equal to $1,9 \cdot 10^{11}$ J/kg, which is less than Ψ_g in $4.7 \cdot 10^5$ times. Even weaker is the gravitational potential ψ on the Earth's surface ($M_3 = 5.976 \cdot 10^{24}$ kg, $R_3 = 6.36 \cdot 10^6$ m), for which it is $6.27 \cdot 10^7$ J/kg, which is less than Ψ_g by 9 orders of magnitude!

It follows that the Newtonian potential ψ_g , taking into account only the potential (static) component of the gravitational interaction, does not reflect the real reserves of gravitational energy. This energy is manifested not only when the configuration of celestial bodies is

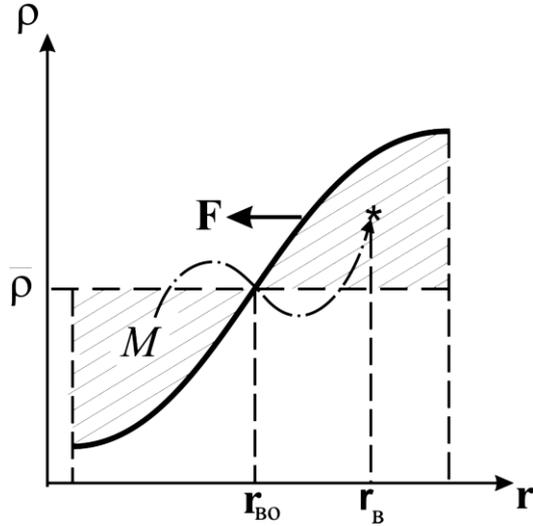


Fig. 1. The formation of waves in non-baryonic matter волнообразования диполь

changed, but also in a number of other processes. In particular, the processes of redistribution of non-baryonic matter between different regions of the universe (its flow from the galaxy to the galaxy) are unavoidable. These processes are illustrated in Fig.1. It shows an arbitrary region of volume V , in which the density of its substance changes monotonically, deviating from some mean (equilibrium) value $\bar{\rho}$ in both directions.

It follows from the figure that the removal of this region from internal equilibrium is due to the transfer of some mass M in the direction of the wavy arrow. Such a transfer is accompanied by a displacement of the center of mass from the position with the radius vector \mathbf{r}_{g0} to the position \mathbf{r}_g , which results in a certain "moment of

distribution" of the mass \mathbf{Z}_g , determined by the expression [7]:

$$\mathbf{Z}_g = M(\mathbf{r}_g - \mathbf{r}_{g0}) = \int [\rho(\mathbf{r}, t) - \bar{\rho}(t)] \mathbf{r} dV. \tag{3}$$

As we see, the removal of the system from equilibrium is associated with the appearance of "displacement vectors" of mass $\Delta \mathbf{R}_g = \mathbf{r}_g - \mathbf{r}_{g0}$, the magnitude of which characterizes the removal of the system from internal equilibrium. It becomes obvious that the internal energy of non-baryonic matter in an inhomogeneous system U depends not only on its mass M but also on the value of the "arm" $\Delta \mathbf{r}_g = |\Delta \mathbf{R}_g|$. The moment \mathbf{Z}_g , and also from the spatial angle φ_g of the orientation of the displacement vector $\Delta \mathbf{R}_g$. This means that the internal energy U of a system possessing a single (gravitational) form of energy, as a function of its state, has the form $U_g = U_g(M_g, \Delta \mathbf{r}_g, \varphi_g)$, so that its total differential can be written in the form of the identity [8]:

$$dU_g \equiv \Psi_g dM_g - \mathbf{F}_g \cdot d\mathbf{r}_g - \mathbf{M}_g \cdot d\varphi_g, \tag{4}$$

where $\Psi_g \equiv (\partial U_g / \partial M_g) = c^2$ is the gravitational potential of the system; $\mathbf{F}_g \equiv -(\partial U_g / \partial \mathbf{r}_g)$ - the gravitational force emanating from it; $\mathbf{M}_g \equiv -(\partial U_g / \partial \varphi_g)$ - the torque of these forces.

The first term on the right-hand side of this identity characterizes the change in the energy of the object of investigation (for example, the nucleus of a future galaxy) due to the accretion of a non-baryonic substance; the second term is the work $dW_g = \mathbf{F}_g \cdot d\mathbf{r}_g$, performed

in the process of transformation of non-baryonic matter into baryon matter; the third is the work spent on rotating this nucleus. Thus, non-baryonic matter, being a spatially heterogeneous medium, is able to participate in three categories of processes, which we called the processes of *replenishment*, *redistribution* and *reorientation* [8]. In most profile disciplines, the object of studying which are homogeneous systems, internal processes are not considered at all. Meanwhile, the study of the processes of transformation of non-baryonic matter, which possesses a single form of energy, into a baryonic (structured) matter, which possesses many of its forms, requires the consideration of precisely these internal transformations.

Indeed, the force $\mathbf{F}_g \equiv -(\partial U_g / \partial \mathbf{r}_g)$, determined according to (4) by the negative gradient of the internal energy under the conditions of constancy of all other independent variables (in this case, the mass $M = \int \rho dV$), is equal to

$$\mathbf{F}_g = -(\partial U_g / \partial \mathbf{r}_g) = -c^2(\partial \int \rho dV / \partial \mathbf{r}_g) = -c^2 \int \nabla \rho dV. \quad (5)$$

The specific value of this force $\mathbf{X}_g = \rho^{-1}(\partial \mathbf{F}_g / \partial V)$, which has the same meaning as the acceleration of gravity \mathbf{g} in Newton's gravitational theory, is expressed by the relation:

$$\mathbf{X}_g \equiv \mathbf{g} = -c^2 \nabla \rho / \rho, \text{ m/s}^2. \quad (6)$$

This expression, obtained for the first time in [9], generalizes Newton's law of gravitation to an intergalactic medium in which there are gradients of the density $\nabla \rho$ of both signs. It indicates not only that in the universe there are gravitational forces not only of attraction but also of repulsion, but also of the existence of specific gravidynamic forces. We called (6) "the law of gravidynamic interaction" [10] because, unlike ordinary gravitational forces, Expressed by Newton's law, the forces \mathbf{X}_g depend on the gravitational potential $\Psi_g = c^2$, which is purely kinetic. But even more important for us is that they far exceed the Newtonian gravitational forces. To see this, it is necessary to consider the process of wave formation in non-baryonic matter.

3. GRAVIACOUSTIC WAVES IN NON-BARYONIC MATTER

According to modern estimates, the density of the intergalactic medium is 10^{-27} g/cm^3 , while in stellar formations such as white dwarfs it reaches 10^{18} g/cm^3 . In a medium so inhomogeneous in density, its self-oscillations inevitably arise. Indeed, in view of the obvious equality $\int \rho(\mathbf{r}, t) dV = \int \bar{\rho} dV = M$, we have:

$$\int [\rho - \bar{\rho}] dV = 0. \quad (7)$$

The integral (7) vanishes when $\rho \neq \bar{\rho}$ vanishes only when, in any region of space with an unchanged mass, the differences $\rho - \bar{\rho}$ have the opposite sign and are mutually compensated. The latter is peculiar to the process of wave formation, which is shown in Fig. 1

for any of the half-waves. This process of wave formation leads to the appearance of kinetic energy of vibrational motion in non-baryonic matter. The magnitude of this energy can be found, taking into account that the displacement of the mass M by a distance $\Delta\mathbf{R}_g$ is carried out for a half-period of the oscillation $\Delta t/2$, which corresponds to a doubled frequency ν . Therefore, taking into account $\lambda\nu = c$, the average velocity of the relative mass displacement in the process of wave formation v_g is

$$v_g = \lambda\nu/2 = c/2. \tag{8}$$

If we take $\Delta\mathbf{R}_g$ as the amplitude of the longitudinal wave A , then the kinetic energy density of the vibrational motion ε^k is expressed by the expression [11] known from the wave theory:

$$\varepsilon^k = \rho v^2/2 = \rho A^2 \nu^2/2, \text{ Дж/м}^3 \tag{9}$$

The value $\varepsilon^k = \rho c^2/8$ is the eighth part of the gravitational energy density of non-baryonic matter $\rho_g = \rho c^2$. However, it is easily convertible to any other form of energy, which makes the gravitational energy of the Universe workable even with the unchanged position of celestial bodies. Therefore, the appearance of self-oscillations in non-baryonic energy can be considered a necessary condition that opens the possibility of the transformation of a non-baryonic (unstructured) substance into baryon in real time.

In view of the fact that the magnitude of the density gradient $\nabla\rho$ increases with decreasing scale of the inhomogeneity $\Delta\mathbf{R}_g$, the force \mathbf{X}_g (6) produced by density waves increases with decreasing wavelength. Therefore, they can be much more significant than the purely gravitational waves caused by the heterogeneity of the distribution of matter on the scale of the universe, and even more so than purely acoustic waves caused by low-frequency pressure fluctuations. We will call them gravity waves to emphasize this feature. Like the forces \mathbf{F}_g , they are always directed against the density gradient (Fig.1) and for the antinodes of such waves are the character of repulsive forces. These forces contribute to the "spreading" of the wave and cause their aspiration to occupy all the space provided to them.

4. TRANSFORMATION OF A NON-BARYONIC SUBSTANCE INTO A BARYONIC

The process of formation of a baryonic substance consisting of protons, neutrons, electrons, quarks, etc. from non-baryonic matter is much easier to understand, starting from the wave theory of the structure of matter [12]. In any case, this view was held by a famous physicist and astronomer Jeans who argued that "in nature there are waves and only waves: closed waves, which we call matter, and non-closed waves, which we call radiation or light" [13]. The process of wave formation in non-baryonic matter best fits into this concept.

We represent the average velocity of the relative mass shift in the process of wave formation $v_g = d\Delta\mathbf{R}/dt$ as the sum of the translational mass transfer rate in this process w with the modulus $w = \lambda\nu/2 = c/2$ and the angular velocity ω of the vector $\Delta\mathbf{R}$:

$$\mathbf{v}_g = d\Delta\mathbf{R}_g/dt = \mathbf{w} + \boldsymbol{\omega} \times \Delta\mathbf{R}. \quad (10)$$

Thus, in the general case, a previously immobile non-baryon mass, possessing only a gravitational form of energy, also acquires the kinetic energy of rotational motion with density

$$\varepsilon^{\text{BP}} = \rho_{\omega} \boldsymbol{\omega}^2 / 2, \quad (11)$$

The last expression confirms the possibility predicted by Jeans of the appearance in the intergalactic medium of closed waves that leave non-baryonic matter as a whole motionless. The appearance of closed waves transporting energy without mass transfer eliminates the contradiction of the vortex models of the structure of matter with the Helmholtz theorem on the impossibility of the appearance and disappearance of vortices in an inviscid medium [14]. Closed waves are easy to imagine by combining the beginnings and ends of wave packets serving as a photon model. Such waves were called by us *clovertones* (from the English «closed wave») [10]. The structures formed by such waves are stable, since in non-baryonic matter there is no dissipation due to the transformation of the ordered motion into a chaotic one. Naturally, the process of the appearance of "embryos" of baryonic matter in the form of closed waves begins where the density of non-baryonic matter has reached the required level, i.e. Mainly in the antinodes of the density waves of non-baryonic matter. It is also natural that the rotational component does not appear in all standing waves. Hence the relatively small fraction of baryonic matter observed in the total mass of the universe (less than 5%).

Closed waves can differ from each other by the frequency, amplitude and phase of the wave, the direction and speed of rotation of its antinodes, the direction, pitch and degree of "swirling" of the plane of its polarization in a particular substance, the number of waves entering into the "packet" and corresponding to this equivalent diameter, etc. [10]. Known are such closed wave formations as the ionospheric layer of our planet [15]. There are also possible nanostructures that leave a point trace in Wilson's chamber or emulsions and are therefore taken for particles.

Gradually, under the influence of local forces of attraction or "pushing" of \mathbf{F}_g , inherent to the wave as a dipole (Fig.1), these closed waves combine into more complex and stable structures such as quarks, protons, neutrons, nuclei, atoms, molecules, etc. In this case, the closed waves that form these structures are located at some distance from each other, i.e. In the antinodes of waves of non-baryonic matter, corresponding to the zones of libration (gravitational equilibrium) [9]. Some of them can be formed by closed waves with diametrically opposite direction of the traveling wave, which we perceive as unlike charges, spins or poles [16]. Adhering to the methodology of energy dynamics [8], which is alien to model representations, we will not consider this issue in more detail here. We only note that the wave theory of the structure of baryonic matter is able to adequately reflect the diversity of not only mechanical, but also chemical, electrical, thermal, etc. Properties of baryonic

matter, without conflicting with known experimental facts. This is sufficient to justify the following proposition concerning the possibility of radiation of light by baryonic matter.

5. THE APPEARANCE OF TRAVELING WAVES IN THE EMISSION OF BARYONIC MATTER

The process of transformation of a non-baryonic substance M_g into a baryonic substance with a mass M_b can be regarded as a phase transition in a multicomponent system of non-baryonic matter and various kinds of baryonic matter, obeying the law of conservation of its energy ($dU_g = 0$). A. Einstein called this process the "condensation" of the ether. According to the identity (4), which is valid for any other component of the material system, the gravitational energy can flow to the baryonic matter either as a result of accretion of the particles of the intergalactic substance onto the surface of the system under consideration, or by internal structural transformations of closed waves (their combination into more complex structures). The energy released during such phase transitions makes the temperature of the baryonic substance different from absolute zero, and its - capable of thermal radiation, characterized by a continuous spectrum. Such a character of the radiation spectrum allows the baryonic matter to modulate non-baryonic matter with frequencies that are not inherent in its general order of vibrational motion. Since any wave is discrete in space as well as in time, this process is of a quantum nature. However, with averaging over time, this process takes on a stationary character, forcing non-baryonic matter to propagate the oscillations modulated in it in the form of traveling waves, which makes the baryonic matter visible. Naturally, in this case the energy is transferred not in the form that it had in the baryonic substance, but in the one that is inherent in the luminiferous medium, i.e. In the form of longitudinal waves of density of non-baryonic matter. Thus, the process of radiation appears as a process of converting energy from one form to another, and not the transfer in space of the electromagnetic energy of the vibrational motion that has arisen in the radiator, as Maxwell and his followers imagined. Proof of this are numerous "side effects" (heating, photosynthesis, photoionization, photoelectric, photochemical, photonuclear, etc. effects) accompanying the absorption of radiant energy in various bodies. In other words, radiation is the process of converting the energy of oscillations of a baryonic substance into the energy of traveling graviakastic waves of a non-baryonic substance with the subsequent partial or complete restoration of the initial form of energy in the radiation receiver. All such phenomena are so thoroughly studied that they do not need additional experimental confirmation.

As for the possibility of the emergence of running longitudinal waves in non-baryonic matter, it follows directly from the existence of an oscillatory form of energy in it. In fact, the total time derivative of the density of non-baryonic matter dp/dt can be represented in a known way as a sum of the local $\partial p/\partial t$ and the convective component $(\mathbf{v}\cdot\nabla)p$:

$$d\rho/dt = \partial\rho/\partial t + (\mathbf{v} \cdot \nabla)\rho. \quad (12)$$

By its nature and in essence, this expression corresponds to the wave equation in its so-called "one-wave" approximation:

$$\partial\rho/\partial t + \mathbf{v} \cdot (\partial\rho/\partial \mathbf{r}) - f(\psi) = 0, \quad (13)$$

where \mathbf{v} is the phase velocity of the wave; $f(\psi) = d\psi/dt$ is a function characterizing its damping.

The fact that this equation belongs to the wave equation becomes especially obvious if the damping is neglected in expression (11) and is represented in the form:

$$(\partial\rho/\partial \mathbf{r}) = -\mathbf{v}^{-1}(\partial\rho/\partial t). \quad (14)$$

This equation is sometimes called "kinematic" (in contrast to the "dynamic" equation of the second order). It describes a wave of density of non-baryonic matter running in one direction (from the source). In the presence of dissipation, Eq. (13) takes a different form depending on the model of the medium and the form of the damping function $f(\psi)$. For nonlinear media with dispersion in the low-frequency region, it is known as the Klein-Gordon equation, and with dispersion in the high-frequency region, as the Korteweg-de Vries equation [7]. Thus, for wave energy transfer it is not necessary to postulate the existence of any vortex fields.

It is also easy to show that the process of radiation transfer by traveling waves obeys the same laws as the processes of thermal conductivity, diffusion, electrical conductivity, and so on. The driving force of this process is, as already noted, the intensity of the gravitational field \mathbf{X}_g , m/s^2 , and the transfer substrate is the radiant flux $\mathbf{J}_g = Mc$ with a density $\mathbf{j}_g = \rho c$ ($kg/m^2 \cdot s$) having the dimension and meaning of the wave pulse. In this case, the equation of radiation transfer in space assumes the form [8] that is uniform with other transport processes:

$$\mathbf{j}_g = -L\mathbf{X}_g, \quad (15)$$

where L is the proportionality coefficient characterizing the transparency of the intergalactic medium and determining the magnitude of the so-called "gravitational redshift". The product $\mathbf{j}_g \cdot \mathbf{X}_g$, W/m^3 , characterizes the flux density of the transferred energy (radiated power). Thus, non-baryonic matter can serve as a luminiferous medium without needing to attract any hypothetical radiation carriers.

6. DISCUSSION OF THE RESULTS AND THEIR EXPERIMENTAL VERIFICATION

According to the theory developed here, there is no need to invent any special luminiferous matter-it is non-baryonic matter itself, from which, in the course of its circuit, all forms of its matter were formed in the Universe, up to galaxies and their clusters. Their

formation begins with the appearance in standing matter in non-baryonic matter of standing waves of its density. To such structures from the standpoint of the wave theory of the structure of matter are also electrons with positrons, which are born from non-baryonic matter in the general case in different quantities (as evidenced by recent experiments of the AMS collaboration with high-energy cosmic particle fluxes conducted at the International Space Station) [17].

Closed waves can be quite stable and exist autonomously, without exchanging energy with their analogous structures, i.e. Leaving non-baryonic matter invisible. However, in the presence of suitable conditions, these closed structures unite and ultimately form celestial bodies that differ from non-baryonic matter by the presence of a certain shape and boundaries. The energy of such bodies is continually replenished due to the accretion of interstellar matter and the condensation of non-baryonic matter. Thanks to this "feeding", baryonic matter acquires the ability to excite longitudinal gravity waves in the non-baryonic matter, which makes it visible. In this case, polarization of these longitudinal waves is realized in the radiation detectors themselves. Some of them may remain similar to longitudinal electromagnetic waves. Thus, radiation exists for as long as baryonic matter, changing its brightness as the celestial bodies evolve.

As far as we know, this concept does not contradict the available experimental data. This concerns, in particular, the mechanical (ponderomotive) action of light on a substance that has been known to astronomers since the time of Kepler in deviating the tails of comets. In accordance with the Maxwell-Bertolli formula $p = (I/c)(1 + R)$, the light pressure p depends on its intensity I , W/m^2 and the reflection coefficient R , i.e. from the mechanical impulse, and not from the physical nature of the waves. This circumstance, which became clear even from the time of P. Lebedev, emphasizes the artificiality of imparting momentum to massless photons. With the development of laser technology and the detection of a non-electromagnetic component in laser radiation [18, 19], this became even more obvious.

Further, the presence of the interaction of electrons with an ultrasonic wave confirms the acousto-magnetolectric effect discovered in 1973 [20]. In this case, an increase in the vibrational energy was observed thousands of times, which indicates the possibility of "accumulation" of gravitational energy by atoms.

Then, numerous occurrences of non-electromagnetic radiation that not only accompanied electromagnetic claus in current-carrying systems, but also originated from objects of inanimate nature, which seemingly does not receive the necessary energy for this from outside [21, 37], were then discovered.

With the development of observational astronomy, direct evidence also emerged of the existence in the near-Earth space of closed waves such as the ionospheric belt of the Earth [15]. Signs of formation of closed waves were also found in a distant intergalactic medium. They appeared in the form of "shock waves" detected by the WISE telescope in front of the star moving at a speed of 24 km/s [38], as well as in the phenomenon of "long delayed echoes" – sporadic occurrence in the space environment of geocentrically oriented surfaces

("radiomirror"), which cause the reflection of the radio signal [39]. However, much more convincing was the discovery of the so-called "baryonic acoustic oscillations" of the matter of the Universe when compiling a three-dimensional map of the starry sky [40]. These oscillations were manifested in the form of large-scale ring-shaped clusters of galaxies of approximately the same diameter (half a million light-years away) in which the galaxies were located either at their center or on the periphery of the ring. Such structures clearly resembled divergent waves arising from the fall of an object into the water, and their approximately equal diameter indicated the resonance nature of the processes of large-scale structure formation in the universe¹⁾ [42]. Thus, the proposed theory has rather serious experimental grounds.

The theoretical significance of the theory proposed here is also important, which excludes the need to invent the existence of any hypothetical "luminiferous" media capable of "transferring energy after it left one body and has not yet reached the other" [6] or provide an accelerated expansion of the universe [43]. The baryonic matter itself, striving to occupy all the space provided to it, in view of the presence of repulsive forces between the antinodes of the waves (Fig.1), can explain both the accelerated expansion of the universe (if it exists) and the retention at a certain distance from each other (in the region of the antinode of gravity waves) not only of galaxies, but also of any other of its structural elements, including the nuclei of atoms. This does not require a balance of centrifugal forces with forces of attraction of charged or gravitating masses - all solve the conditions of gravitational (more precisely, gravity-acoustic) equilibrium [9]. This is the solution to the most acute problem of the stability of not only the nuclei of chemical elements, but also of any atomic, crystalline, and so on ordered structures.

Adoption of the proposed concept does not harm the development of electrical engineering and radio electronics, but, on the contrary, contributes to them, since it becomes clear that the electric energy can propagate not only by electron transfer but also by traveling wave. Such, apparently, is the nature of the transfer of considerable power over a single-wire line of an insignificant cross section [35].

In many ways, the theory predicts the identity of the properties of non-baryonic matter to the properties of the ether. To begin with, both these substances have the properties of an all-pervasive environment, isolation from which does not exist. Both of them serve as a luminiferous medium with its own energy and therefore able to accumulate and carry it. In both, light is propagated by longitudinal waves, both are not characterized by energy dissipation (viscosity). Both of them are characterized by the selectivity of the action on certain structural elements (particles) of the substance. Both of them can cause in the receiver of radiation not only optical phenomena, but also many other effects. Both correspond to the concept of short-range interaction, which, as stressed by A. Einstein, "assumes the existence of continuous fields" [44].

¹⁾ Judging by the period of fluctuation in billions of years, these waves are far from those that were discovered very recently in real time by the collaboration "LIGO" [41].

Finally, both ether and non-baryonic matter are not only a "building material" for all forms of matter in the universe, but also a true "fuel" supporting the process of their radiation [9]. Indeed, all that "reserve" of energy that the stars allegedly spend in the process of thermonuclear fusion, was acquired by them in advance with the condensation of a non-baryonic substance, i.e. had an external source. In addition, the energy release in thermonuclear reactions is limited by the relative mass defect $\Delta M_c/M_c$, much less than unity, while the relative mass of non-baryonic matter $\Delta M_g/M_g$ coming from the surrounding space during its accretion and conversion into baryonic matter is unlimited. This is also evidenced by the existence of ball lightning that emits energy for a long time (up to 15 minutes). It is impossible to ignore the numerous designs of so-called "superunit" devices whose output power exceeds the power consumption due to "feeding" them with an unknown form of energy of the environment [45], following the invention of the "amplifying transmitter" N.Tesla [46]. The probability is also great that the so-called "condensation" of a non-baryonic substance initiates the reactions of the so-called "cold nuclear fusion", accompanied by excessive heat release. The reason for this is the absence of gamma-radiation required for thermonuclear transformations [31]. To verify the participation of the external environment in these processes, it is enough to recall the explosion of a hydrogen bomb over Novaya Zemlya in 1961, at which the energy release exceeded the calculated one by a factor of 10^5 in the absence of any other known energy sources [47]. In a word, both ether and non-baryonic matter are essentially different names for that invisible ("hidden") mass of the universe, which physicists tried unsuccessfully to expel from physics, replacing it with an electromagnetic field, a gas of photons, a "physical" vacuum and "dark" energy [48].

The adoption of the proposed concept does not cause any damage to the development of electrical engineering and radio electronics, but, on the contrary, contributes to them, since it becomes clear that the electric energy can propagate not only by electron transfer but also by a traveling wave. This explains the fact of transferring considerable power through a single-wire line of very small cross section [35]. Moreover, the theory predicts the possibility of the appearance of "levitation" by creating an artificial gravitational field with a density gradient directed toward the gravitational field of the Earth. This explains the theory of the emergence of a small thrust in "EM-Drive" type propulsors with the presence of a density gradient in the chamber of the electromagnetic field (in reality a gravitational field) for which this chamber is not closed [49].

Attractive proposed graviacoustic theory of light and in terms of predictions of new phenomena. In it, gravistatics and gravidynamics are represented by as many different laws as the equations of electrostatics and electrodynamics. The connection between gravity and acoustics, found in it, no less close than between electricity and magnetism, puts on the "agenda" the study of the heritage of the outstanding American inventor John Worrell Keely, who first found a way to control the "etheric forces". In 1872...85 years, he demonstrated a fundamentally new mechanism, which was driven by acoustic vibrations, as well as the alternate emergence of kilogram metal balls in a vessel with water, under the influence of

vibrations excited in a vessel with the help of conventional tuning forks. He also demonstrated a large metal wheel, which was driven into rotation with the help of the same tuning forks. With the help of sound, he moved a three-ton capacity, which, after his death, was found under the floor of his laboratory and was mistaken for a source of compressed air. The most impressive achievement of Kiely was the creation of an aircraft operating on these principles. This apparatus is described in D. Davidson's book *Breakthrough to the Sources of New Free Energy* [50]. More than once, the *New York Times* wrote about these sensational experiments. To invest in its development, the company "Keely Motor Company" was even established. However, after his premature death, all these ingenious developments were considered charlatanism and were soon forgotten.

It is also worth remembering the so-called "Tibetan sound levitation", described in Henry G. Kiyelson's book *"Lost Technologies"* [51]. It reports on the report of Dr. Jarl who, in 1939, observed and photographed the process of lifting of 1.5×1 m stone blocks by Tibetan monks to a height of about 250 m with the help of 19 musical instruments located at a certain distance from it. These instruments produced rhythmically accelerating sounds that made such blocks slowly (within 3 minutes) "float" onto a steep rock and lay on the site of the sanctuary being built in a place completely inaccessible in other ways.

The gravity concept of light proposed in this article and the relationships obtained in it show that the events described in these books can be as real as the often observed UFO flights, which are accompanied by the same optical, mechanical and electrodynamic effects. In this respect, the connections between gravitation and acoustics established in the framework of the proposed theory of light provide the basis for a further scientific approach to studying the conditions of levitation and the creation of apparatuses such as UFOs.

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