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The Attractive Force mechanism of Physical Bodies in the Ethereal Medium

Feliks F. Gorbasevich
gorich@geoksc.apatity.ru

As is known, sizes of atoms, including their electron shells are fractions and units of an angstrom, $Å = 1 \cdot 10^{-10}$ *m*. The nuclei have sizes close to 10^{-15} *m*. At the same time, the wavelength, for example, of visible light, is $(4\text{-}7) \cdot 10^{-7}$ *m* [1]. There are many experimental data involving the propagation of light in gaseous, fluid and solid media. The refraction coefficient, which can be measured to a high degree of accuracy in transparent media, is the parameter closely related to the propagation velocity of a light wave. Let us consider a relationship between the refractive coefficient n and the density ρ of some substances (Fig. 1). Parameters of the majority of substances (anhydrite, apatite, baddeleyite, beryl, boracite, galena, halite, gypsum, disthene, dolomite, calcite, quartz, cordierite, corundum, leucite, microcline, muscovite, nepheline, orthoclase, periclase, rhodonite, sillimanite, staurolite, zircon, eudialyte and many others) are subject to the relationship:

$$n = 1 + 0.2\,\rho\,. \qquad (1)$$

This relationship has been depicted as a dotted line in Fig. 1. In the figure, the substances whose relations ρ and n are outside the general relation, are numbered. For example, the ratios for diamond, sulphur, iron, titanium and some of their compounds on the plot are above the general relationship line. The relations for some compounds of fluorine, barium, phosphorous, tin, etc. are below this line.

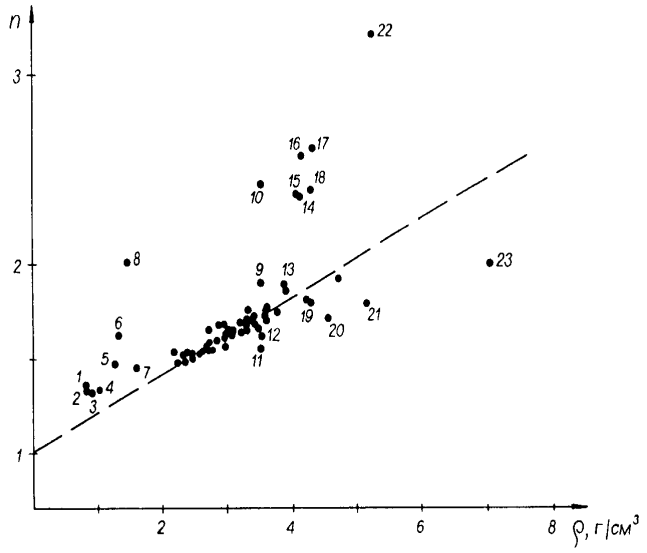

Fig. 1. The relationship between the refraction coefficient n and the density ρ of some liquid and solid substances, minerals (based on the data [2, 3]). 1 - ice, 2 - acetone, 3 - alcohol, 4 - water, 5 - glycerine, 6 - carbon bisulphide, 7 - carbon tetrachloride, 8 - sulphur, 9 - titanite, 10 - diamond, 11 - grothite, 12 - topaz, 13 - siderite, 14 - wurtzite, 15 - sphalerite, 16 - brookite, 17 - rutile, 18 - goethite, 19 - xenotime, 20 - barite, 21 - monazite, 22 - hematite, 23 - cassiterite.

As a whole, transparent substances, including gases, fluids and solid substances have a refraction coefficient *n* which is more than unity [4]. This means that the light wave's (photon's) velocity in physical media is always lower than in a vacuum. It is natural to assume, that the deceleration of the velocity of light propagation in physical media happens due to the effect of bending around some, impenetrable areas for photons. The photons of low energies have to bend the areas of space occupied by electron shells and atomic nuclei. High-energy photons penetrate into the areas that are closer to a nucleus. X-ray waves interact directly with the area of an atomic nucleus. The deceleration of (the) light velocity (of) in physical media is due to the effects of photon's re-emission, recombination and luminescence, to a large degree. However, the medium in which light waves propagate, is the ether. Thus, it is logical to assume, that the ethereal medium, being displaced by nuclear forces, is absent when close to an atomic nucleus or inside it.

In Figure 2, a conditional atomic nucleus is represented in simplified form as a unit spherical mass. This primitive scheme shows that the spatial net-like structure of ether has been distorted by the spherical mass. Near the spherical mass, this structure is appreciably loosened. As the structure moves away from the spherical mass, the loosening degree will diminish. It is natural, that the sizes of such a mass, for example, an electron and a particle of the ethereal medium, are incomparable in size. The relation of their size is much greater than shown in Fig. 2.

The structure, near which there are no physical masses, has the greatest density. The structure distorted by the presence of mass, has less density. A spatial net-like structure formed by unlike particles attracted to each other, develops great pressure on their contacts as was shown above.

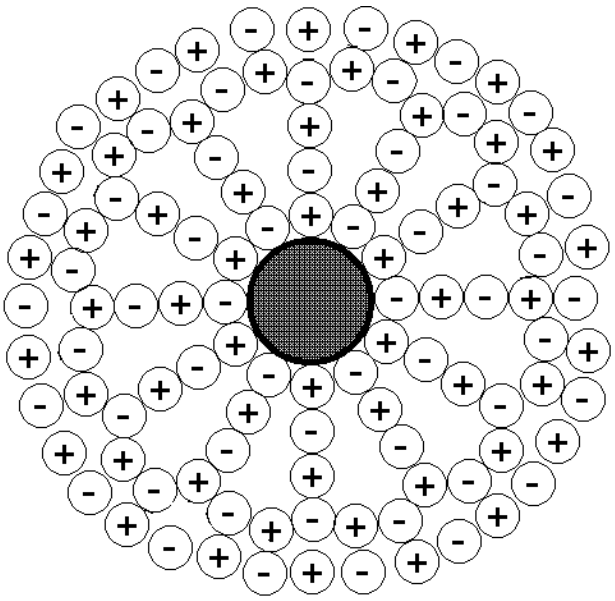

Fig. 2. A simplified scheme of the spatial network structure of ether in the vicinity of a unit spherical mass.

The same, or less pressure will be exerted on the spherical mass as well, Fig. 2. This pressure will be formed due to disconnection contacts of unlike particles immediately contiguous to the spherical mass. The pressure on the spherical mass will be strengthened due to distortions of the second, third, fourth etc. line of the

structural lattice, situated, accordingly, in the second, third, fourth etc. line from the spherical mass. This pressure is caused by a need of particles situated in the second, third etc. line to be as close as possible to each other and to restore the non-deformation structure.

At some greater distance from the centre of the spherical mass, the general view of the structural medium can be conventionally represented as concentric spheres inserted one into the other, Fig. 3.

Conventionally, we shall consider, that in a medial concentric sphere (1, Fig. 3) all particles of the opposite kind connect with each other directly, without intervals. Then in the concentric sphere located further from the mass (2, Fig. 3), since the number of the opposite particles should correspond to each other, intervals will appear between them. In the concentric sphere located closer to a physical mass (3, Fig. 3), the accumulated particles will also be less dense, because it is impossible to dispose the same number of particles here, as in the medial sphere. Some of the particles from the near sphere will be forced out, and empty space will occupy their places.

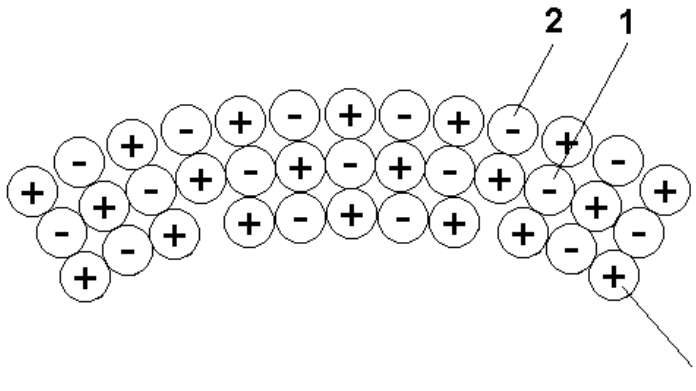

Fig. 3. A fragment of the structure of the ethereal medium at some distance from a physical mass.

The diagram, introduced in Fig. 3 enables us to conclude that the ethereal medium in an environment of a physical mass is less dense and "looser", than in a medium without physical masses. It is easy to imagine that, as we move away from

a physical mass, the density of the ethereal medium will increase, and its "loosening" will diminish proportionally to the distance from this mass.

If we imagine some physical test mass and place it inside a non-perturbed ethereal medium, this test mass will distort the structure of the ethereal medium as (it is) shown in Fig. 2. The test mass will experience the greatest equal pressure from all directions. Now let us move the test mass to the medium that has already been distorted by the presence of some physical mass, Fig. 3. In this case, the pressure on the test mass will not be identical from all directions. The test mass will be under the pressure of a great many concentric layers of different curvature, depending on the distance to the physical mass. The concentric layers of lower curvature will exert the greater pressure on the trial mass. The pressure exerted by the layers with greater curvature that are closer to the physical mass, will be lower. Thus, the ethereal medium in the field of influence of a physical mass appears to be gradient. The vector of this gradient is directed to a physical body, Fig. 4. The force pushing this body to a physical mass will be applied to the test body. This is just the fundamental basis for gravitational forces in the ethereal medium consisting of equal, but opposite in sign, particles.

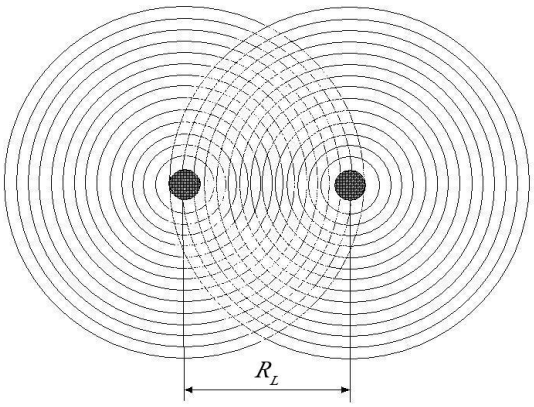

Fig. 4. Gravitational field produced by two masses.

Thus, a loose ethereal medium represents space, to which free masses from the area of space, with denser ethereal medium are displaced. If the lattice is curved, for example, due to the presence of some mass inside the lattice, it is less dense. In such a curved lattice, a free mass will move in the direction of lowering the gradient of the lattice density (or otherwise, in the direction of greater "loosening").

The law of gravitation is rather easily deduced from the above concepts. Let us assume, that along the circumference L_1, of the concentric layer 1, Fig. 5, formed around of the heavy mass M_1, the precise number n_1 of particles of opposite signs

with diameter d, or $L_1 = n_1 d$, are stacked. Let us consider, that $L_1 >> d$. The radius of such a circle will be equal to $R_1 = n_1 d/2$, and the quantity of particles $n_1 = 2\pi R_1/d$. As follows from our model the next concentric layer that is closer to the heavy mass with the circumference L_2, will have the radius R_2, smaller just by the magnitude of the particle d size than the first one, $R_2 = R_1 - d$. The circumference of layer 2 will be equal to $L_2 = 2\pi R_2 = d(n_1 - 2\pi)$, and the number of particles $n_2 = 2\pi(R_1 - d)/d$. Otherwise, $n_2 = n_1 - 2$.

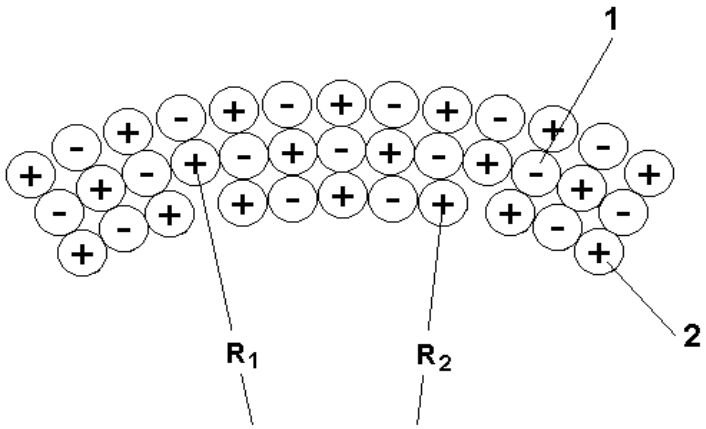

Fig. 5. The schema for quantity calculation of particles in concentric layers in the ethereal medium around a physical mass.

Accordingly, in layer *2* the number of particles will be by 2π less than along the circumference L_1. On the other hand, each particle of the circle L_1 must be corresponded by another, opposite in sign, particle L_2. Then due to the $n - 2\pi$ number of particles in the second concentric layer, 7 particles of the first layer will not be compensated. Therefore particles of layer 2 will be at slightly greater distance from each other, than the particles of the first layer. Thus, in the limits of concentric layer 2, some loosening of the ethereal medium occurs.

In some k-layer that is closer to the centre by the value kd along the circumference, the number of particles $n_k = n_1 - 2k\pi$ will be stacked. The value of the ethereal medium loosening in the k-layer in relation to the first layer can be

expressed by the coefficient, showing the ratio of the number of particles in each layer to their circles:

$$\Delta_k = (n_1 - 2\kappa\pi)/n_1 = 1 - 2\kappa\pi/n_1. \quad (2)$$

Formula (2) in fact, at great numbers n, expresses a modification of the diameter (radius) or curvature of concentric layers, in the limits of which, ideally, the particles of ether are disposed.

It is easy to show, that with distance from the centre, the curvature (for spherical surfaces) diminishes proportionally to the square of the radius of the sphere. Accordingly, the degree of the vacuum medium "loosening" will decrease as much as the distance from the mass disturbing vacuum, will increase.

Let us imagine the presence of a point of mass M_1 in the homogeneous, non-perturbed vacuum. As was already shown, with distance from point mass M_1 the degree of vacuum "loosening" will diminish proportionally to the first power of distance R to the centre of mass that is M_1/R. Now we shall introduce the second mass M_2 into the point located at (the) distance R from the first mass. Mass M_2 will cause "loosening" of the vacuum equal to M_2/R at the area of mass M_1. Thus, the mutual attraction of the two masses M_1 and M_2 will be proportional to the product of the two foregoing expressions,

$$T = -\frac{M_1 \cdot M_2}{R^2}. \quad (3)$$

As is known, the law of gravitation is stated as follows: two material points possessing masses M_1 and M_2 are attracted to each other with force F:

$$F = -g\frac{M_1 \cdot M_2}{R^2}, \quad (4)$$

where R is the distance between the points, and g is the gravitation constant equal to $\sim 6.67 \cdot 10^{-11}$, $n \cdot m^2/kg^2$ [5].

From this example it is clear, that the law of gravitation is directly deduced from the described model of the ethereal medium. When analysing formulas (3) and (4) one should take into consideration that ethereal particles are extremely small.

Thus, the presence of unit masses shown in Fig. 2, or their accumulation, distorts the configuration of the spatial net-like structure of the ethereal medium. As the unit masses concentrated mainly in nuclei are bound to each other by particular forces, forming solid, liquid and gaseous bodies, deformations introduced into the spatial net-like structure are partially summarized from each unit mass. In the end, it leads to loosening, or lowering the specific density of the ethereal medium. The greater the total mass of a physical body, the greater is the loosening. It is great in the vicinity of planets. It is even greater in the vicinity of a massive star. Loosening of the ethereal medium created by galaxies, stretches for astronomical distances. The potential theory [6] allows one, from the given mass distribution, to determine mutual gravitational forces in planetary and more complicated systems.

The explanation of the nature of a mutual attraction of physical bodies, in our opinion is one of the most important results of the ether concept. As mentioned earlier, I. Newton, MacGullagh, W. Thomson et al. pointed to the presence of quasi-solid ether deformed by physical bodies [7-11]. There are experimental data confirming such a strain. For example, light propagating in the environs of a massive body propagates with lower velocity than when it is far from it. During radio-location of Mercury and Venus, as they moved behind the disk of the Sun, an additional signal delay stipulated by the gravitational field of our star, was about $2 \cdot 10^{-4}$ s [12]. Thus, lowering of the rigidity, "loosening", and deformation of the ethereal medium near physical bodies have been confirmed.

The proposed concept of the ethereal medium structure explains the nature of inertial forces, and the reason for identical acceleration of bodies of different mass

in a gravitation field. Each physical body at rest occupies a certain space in the ethereal medium, displacing a part of the net-like ether and distorting its structure, as it is shown in Fig. 2-5. Without the influence of gravitation masses, the ethereal medium will exert an equilateral pressure on this physical body. If a physical body (nucleus) moves uniformly, the ethereal medium will flow around it. In the direction of the body's motion, in front of it, some mass of the ethereal medium will disconnect. Behind the body, the same mass, with the same velocity, as in front of the body, will close. The moment of momentum of masses located along the line of motion in front of the body and behind it will be equal. As the ethereal medium has no ability to absorb or disperse energy, uniform motion of a physical body can continue indefinitely long.

Another situation will be observed during acceleration of a physical body. In this case the moment of momentum of the ethereal medium mass located in front of the body and behind it will differ. To cause an acceleration of a physical body it is necessary, according to the second of Newton's laws, to apply force to it. To cause an acceleration of a heavier body, it is necessary to disconnect a much greater number of particles of the ethereal medium, proportional to the mass of this body along the line of its motion. Thus, the acceleration of a light and a heavy body, for example, in the gravitation field of the Earth, will be identical. The absence of ether, as a medium, actively interacting with an accelerated mass, contradicts the third of Newton's law of action and reaction.

It is the interaction of the accelerating charge with the ether medium that enabled J.J. Larmor [13] to propose the following hypothesis: since atoms consist of electron systems, it may be proved that the inertia of ordinary weighty matter can be explained by the excitation of self-inductance currents during acceleration of the weighty body. Every electron, as it accelerates together with the body, excites convection self-inductance currents around itself. In this case, according to the energy conservation law, some work should be done to produce these currents (local magnetic field of self-inductance) and to set the electron in motion.

But this hypothesis was not supported by physicists at that time. To our mind,

the idea of J.J. Larmor is fruitful and it is necessary to return to its development.

A physical body moving uniformly in the ether medium does not meet resistance. Even D'Alambere pointed to the possibility of a body maintaining strait-line uniform motion and meeting no resistance in an ideal liquid. Thus, the ether medium resembles an ideal liquid by its properties, but at the same time it has some characteristics of a specific solid body.

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