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Gravitational, electrostatic and magnetic interactions: interpretation at the metaphysical reality level

Abstract

The impossibility of the existence of the gravitational (G), electrostatic (E) and magnetic (H) fields as physical realities is shown. A layer of the inorganic world, the Active Ether (AE) which is present everywhere in the universe as a metaphysical reality is responsible for G, E and H interactions. This reality differs from the physical one because of its invisibility. The AE is a carrier of the algorithms of G, E and H interactions. It is characterized by informatics - the ability to produce, store, send, receive and process information. Micro-particles, electrons and atomic nuclei, are nature's active objects. They are characterized by informatics and the ability to self-motion step by step. The AE has a periodic G, E and H informational effect on microscopic objects (electrons and atomic nuclei). The microscopic objects process this information and transform it into motion.

Section 1. Introduction. In classical physics the gravitational (G), electric (E) and magnetic (H) fields are represented as a form of matter, as substance continuously distributed in space [1]. These fields are characterized by the potential and the electric vector representing the gradient of the potential. G, E and H interactions are an experimental fact. However, as analysis shows, there are no physical realities such as G, E and H fields in nature. In this paper we are going, firstly, to justify this statement. Secondly, we are going to give the interpretation of G, E and H interactions at the metaphysical reality level. In the inorganic world (N-world) to which belong G, E and H interactions physical (natural, bodily and visible) as well as metaphysical (natural but invisible) realities take place [2]. Correspondingly, the cognition of nature can be performed both at the physical level and at the level of metaphysical reality. The current physical picture of the world fragmentarily presented in the last five-volume edition of the "Physics Encyclopedia" [1] is a result of the nature cognition at the physical level. The questions that come "beyond physics", "above physics" and "after physics" are interpreted at the metaphysical level. All the questions about the structure and functioning of the N-world, which are of an ideological nature, can be considered at this level. In our view, the questions concerning the nature of G, E, and H interactions are, of course, of this kind.

Let us formulate the problems associated with G, E and H fields in the form of appropriate paradoxes. The gravitational field paradox is as follows. The gravity vector of a mass point is defined according to the formula [1]:

$$\vec{q} = km\vec{r} / r^3 \ , \qquad (1)$$

where k is the gravitational constant, m is the mass of a micro-particle or an atom or any body reduced to a mass point, r is the distance to the observation point. Here it should be noted that the vector $\vec{q}$ has the dimension of acceleration. The strength $\vec{q}$ produced by a celestial object is defined as a superposition of vectors (1) from all the micro-particles composing this object. And the more the mass of the celestial object is, the larger the distance at which the gravitational interaction can be detected. From that we conclude that each micro-particle produces the gravitational field at arbitrarily large distances. Let us give an example. Pluto orbits the Sun at a distance of $6 \cdot 10^9$ km and experiences its attraction. This means that every micro-particle of the Sun produces its own portion of

gravitational field at these distances according to formula (1). Moreover, it is commonly thought in astronomy that the gravitational field of the Sun extends to a distance of $3 \cdot 10^{13}$ km (Hill sphere). With this in mind, the elementary field of every micro-particle of the Solar system must have a scale of the Hill sphere. Such a conclusion is a consequence of the concept that the gravitational field is produced, or, to be more precise, is created and maintained by material objects.

Here we face the following problem. On the one hand, calculations based on formula (1) are in agreement with astronomical observations. However, on the other hand, the idea of the production of the gravitational field by an isolated micro-particle at astronomical distances cannot be explained reasonably. Let's call the gravitational field attributed to any object (electron, proton or other atomic nuclei) the elementary gravitational field of a micro-particle. In our view, here we are dealing with the paradox of the philosophical level, which concerns the gravitational field. From the above it follows that the gravitational field paradox lies in the contradiction between the micro-scale of the micro-particles localization and the astronomical scale of the elementary gravitational fields created by them.

Now, let us turn to the electric fields, the source of which is the micro-particles with positive or negative charge – electrons, protons and atomic nuclei. The electric field vector of a micro-particle is defined by the following formula

$$\vec{b} = ke\vec{r}/r^3 \ , \tag{2}$$

where k is the Coulomb constant, e is the electric charge of a micro-particle, r is the distance to the observation point. Electrically charged bodies produce electric fields whose scale may be considerable. They can extend to a distance of tens of meters, the electric field vector at the observation point being defined as a superposition of the vector field strengths from the electric charge of each micro-particle. From this we conclude that an electrically charged micro-particle creates the electric field at the distances which are large compared to its size. For example, the electric field of high-voltage transmission lines extends to tens of meters. Here we face a problem analogous to the gravitational field paradox. The electric field paradox lies in the contradiction between the micro-scale of the localization of electrically charged micro-particles and the macro-scale of the elementary electric fields created by them.

The third kind of physical fields is the magnetic field which is produced by moving micro-particles with positive or negative electric charge. The scale of magnetic fields may be considerable in comparison with the scale of moving micro-particles (electrons, protons and atomic nuclei). For example, the magnetic fields of conduction currents may extend to tens of meters. Here we face a problem analogous to the electric field paradox. The magnetic field paradox lies in the contradiction between the micro-scale of localization of moving, electrically charged micro-particles and the macro-scale of the elementary magnetic fields created by them.

It should be noted that in the N-world there are other large-scale magnetic fields whose sources are not completely clear. Such fields include, first of all, the magnetic field of the Earth. This field is assumed to be produced mainly by the electric currents flowing within the Earth. Even more complicated is the question about the interplanetary magnetic field in the Solar system.

Section 2. In this section we discuss the ways of solving the gravitational field paradox. In classical physics this field is generally assumed to be produced (created and maintained) by the objects of nature possessing mass. This physical idea goes back to the Newton's law of universal gravitation, which is interpreted as the universal property of matter to create the gravitational field and to experience the effect of gravitational fields. A body with spherically symmetric mass distribution generates external gravitational field with the strength equal to that calculated for a mass point with the mass equal to that of the body. The intensity of this field is directly proportional to the mass and inversely proportional to the square of the distance. If the body moves, its field follows it. The

presence of a test body in the gravitational field of another body does not change this field. The acceleration of bodies in the gravitational field does not depend on their masses. In astronomy, it is believed that the gravitational field of the Sun extends to $3 \cdot 10^{13} km$ (Hill sphere). The listed statements of the classical gravitation theory of Newton have been checked within the Solar system with great accuracy [1].

To resolve the gravitational field paradox, first of all, we need to abandon the existing concept that this field is produced (created) by the objects of nature possessing mass. This statement allows us to resolve the gravitational field paradox only partially, because this partial solution of the paradox does not result immediately in the denial of the gravitational field existence. It simply means breaking of the causal relation between the micro-particle and the elementary gravitational field attributed to it in the framework of physics. Here the next question is raised, if such an elementary field can exist by itself, not as a field created by a micro-particle but as an attendant factor. Here, we have to keep in mind that such an elementary field must be of the astronomical scale, moreover, it must have the extent of the Hill sphere with radius $3 \cdot 10^{13} km$. Having analyzed this question, we failed to develop reasonable arguments in favor of a positive response to it and came to the conclusion that elementary gravitational fields associated with micro-particles cannot exist. Accordingly, in nature there is no gravitational field as a physical reality at all.

The absence of such a field in nature forces us to seek for an alternative explanation of the gravitational interaction. To achieve this goal, first and foremost, we must assume the existence of hypothetical Something that is responsible for the gravitational effect on micro-particles. Let us call this Something the Active Ether (AE). It is natural that it should be present everywhere within the Hill sphere, moreover, the external boundaries of the Solar system will be determined by the extent of the AE. It exists independently of matter. By introduction of the Active Ether (AE) responsible for the gravitational interaction into the structure of the N-world we achieve the complete solution of the gravitational field paradox.

In order to conduct the gravitational activity, the AE should possess the following potentials. Firstly, it should possess its own coordinate system on the scale of the Hill sphere. Secondly, it should be able to control the positions of all the micro-particles in the Solar system and to exercise such a control in its own coordinate system, if necessary. Thirdly, it should be the carrier of the algorithms of the gravitational effect on all the particles in the Solar system. Fourthly, it should conduct the gravitational activity only in the locations of the micro-particles. The potential for such an activity should be inherent in it throughout the extent of the Hill sphere.

Further, the key issue is about the method of the AE gravitational effect on micro-particles. The analysis shows that there are only two possible variants. The first variant is the influence exerted by the AE on micro-particles by means of force. The force vector is defined according to the formula

$$\vec{F} = m\vec{p} \ , \tag{3}$$

where m is the mass of a micro-particle, $\vec{p}$ is the vector of an imaginary gravitational field in the location of the micro-particle. The vector $\vec{p}$ is a superposition of the strength vectors of imaginary elementary gravitational fields from every micro-particle in the Solar system. We should assume that the AE is able to carry out such tedious computations. The AE has to carry out such computations periodically because of the change of the micro-particle position due to its forced motion. Moreover, the AE needs to "know" the magnitude of the macro-particle mass (m), and to multiply the quantity m by the vector $\vec{p}$. Further, the AE must act on the micro-particle with the force $\vec{F}$ – (3), while the micro-particle must experience the acceleration $\vec{a}$ according to the classical formula

$$\vec{F} = m\vec{a} \ . \tag{4}$$

Here we should note the following. The gravitational interaction consists of two components. The first component is the way the AE acts on the micro-particle. The second

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component is the reaction of the micro-particle to this action. In the first possible variant of the gravitational interaction considered above the AE displays corresponding gravitational activity, and micro-particles are involved in it just as passive objects of nature.

Session 3. In this session we consider the second variant of the gravitational effect of the AE on micro-particles. It consists in the assumption that the AE acts on the micro-particle gravitationally by means of providing relevant information to it. The micro-particle acquires this information, processes it and makes a decision. After that it realizes this decision. In order to act on the micro-particle gravitationally in accordance with the second variant, the AE should possess informatics - the ability to produce, store, send, receive and process information. The same properties should be inherent in micro-particles as well – electrons, protons and other atomic nuclei. In addition, the ability to self-motion must be inherent in micro-particles. In the following we will call the micro-particles which are active objects of nature the micro-objects.

It is believed in physics that the law of universal gravitation has an absolute character. It is because of the absolute character of this law why the vector $\vec{p}$ of the imaginary gravitational field strength at any point within the Hill sphere is defined as a superposition of vectors $\vec{q}$ – (1) of all the micro-objects in the Solar system. That is why the vector $\vec{p}$ defined this way has a basic character.

Further, we need to define a basic parameter, which would not violate the law of universal gravitation if provided by the AE to the micro-objects in the Solar system. Such a parameter can be defined unambiguously in the following way. The imaginary gravitational field with the strength vector $\vec{p}$ acts on the body with mass m with the force $\vec{F}$ according to formula (3), which causes it to accelerate in agreement with classical law (4). There is an obvious equality of forces in (3) and (4).

$$\vec{F} = m\vec{p} = m\vec{a} \ . \tag{5}$$

It follows from (5) that the acceleration vector of the body in the imaginary gravitational field is equal to the vector of the gravitational field strength:

$$\vec{a} = \vec{p} \ . \tag{6}$$

A formal conclusion may be made from (6) that the AE provides information to micro-objects in the form of the vector $\vec{p}$ and further the micro-objects transform it into the acceleration vector $\vec{a}$. However, this is not the case, because there is no gravitational field in nature, respectively, there is no vector $\vec{p}$. It follows from here that the AE provides information to micro-objects immediately in the form of the acceleration vector $\vec{a}$. It defines the vector $\vec{a}$ as a superposition of vectors $\vec{q}$ - (1) from all the micro-objects of the Solar system. It is therefore quite natural that the vector $\vec{q}$ - (1) has the dimension of acceleration. The universal gravitation law will hold valid naturally if such a procedure of the computation of the vector $\vec{a}$ is used.

As is well known, the acceleration of a body does not depend on its mass in gravitational interactions. This is an experimental fact. In the framework of classical physics the acceleration vector of the body $\vec{a}$ in the gravitational field is equal to the strength vector $\vec{p}$ which, of course, is independent of the mass of a test body. At the metaphysical level this law is interpreted as follows. The AE provides the same information in the form of the gravitational acceleration vector $\vec{a}$ to all micro-objects – electrons, protons and other atomic nuclei. This fact is essentially important, because the gravitational acceleration does not influence the mutual relations between micro-objects of different masses in atoms, molecules and in condensed matter.

Here we should pay attention to the following fact. The AE has a gravitational effect exactly on electrons, protons and other atomic nuclei, which compose all bodies and matter. Exactly these objects possess the ability to acquire information from the AE in the form of the gravitational acceleration vector $\vec{a}$ and to transform it into the motion with the

same acceleration. The motion of all the material bodies in nature are reduced to the basic self-motion of these micro-objects.

As has been mentioned above, the gravitational interaction consists of two components. The first component is that the AE determines the gravitational acceleration vector $\vec{a}$ and provides respective information to the micro-object. This component has been considered above. The second component is the reaction of the micro-objects to this information. The AE periodically provides information to the micro-object in the form of the vector $\vec{a}$, in the limiting case with the quantum interval of time ΔT. After such information is received, the micro-object moves 1 step by itself, according to the algorithm [2]

$$\Delta \vec{L}_n = \Delta \vec{L}_{n-1} + \vec{a}\Delta T^2 \ , \tag{7}$$

where $\Delta \vec{L}_{n-1}$ is the previous step. The value of $\Delta \vec{L}_n$, of course, does nor exceed $c\Delta T$, where c is the speed of light. When $\vec{a} = 0$, the micro-object moves with constant step what is treated in physics as an inertial motion. Let us note once again that the motion of any body in nature is reduced to the self-motion of micro-objects according to algorithm (7).

Next, note the following. The basic formula $\vec{q}$ − (1) contains divergence when $r \to 0$. For the AE it is not a problem. It simply excludes the consideration of that object at the localization of which the calculation of the vector $\vec{a}$ is carried out. Certainly, the AE provides information in the form of the vector $\vec{a}$ exactly to this micro-object. The AE can exclude the neighbouring micro-objects from the calculation of the vector $\vec{a}$ as well, without loss of accuracy.

By consideration of the gravitational interaction at the metaphysical level the following question arises. Does the AE determine immediately the vector $\vec{a}$ or does it determine the gravitational potential φ first and then the vector $\vec{a}$ as the gradient of φ? As analyses shows, the first variant considered above is more preferable. Now let us give a more detailed description of the procedure of determination of the gravitational acceleration vector $\vec{a}$. The AE decomposes the vector $\vec{q}$ − (1) into 3 components in its coordinate axes. Then it sums up the components of vectors $\vec{q}$ − (1) of all the micro-objects in the Solar system. As a result it obtains the components of the vector $\vec{a}$ and then the vector itself. Such a procedure of calculating the vector $\vec{a}$, transmitting it to micro-objects in the form of information and realizing this acceleration by micro-objects can be called the algorithm of the implementation of the law of universal gravitation. Here we should note an extreme unhandiness of the calculation of the basic vector $\vec{a}$. We don't claim that such calculation is beyond the AE's strength. If the AE adheres exactly to this method of calculating the vector $\vec{a}$, this leads to the absolute character of the law of universal gravitation as applied to the Solar system, what is in agreement with the current concepts of physics.

In principle, at the metaphysical reality level, a more flexible approach to the assessment of the nature of gravity in the Solar system is possible. The AE can even use optimized algorithms for calculating the gravitational acceleration vector $\vec{a}$. We come to this point first of all because of the planetary structure of the Solar system with the central luminary – the Sun. In these circumstances, it is advisable to calculate the vector $\vec{a}$ in the peripheral regions of the Hill sphere taking into account only the matter of the Sun and planets localized at their centers. Note, that the peripheral regions occupy most of the Hill sphere if we take into account, firstly, the location of planetary orbits in one plane, secondly the ratio between the average radius of the Pluto's orbit and the Hill sphere radius ($5{,}91 \cdot 10^9 km$ и $3 \cdot 10^{13} km$ respectively). However, we will not delve into this topic. Note that a number of questions concerning this subject were considered in [2] in the context of analysis of the Solar system functioning at the metaphysical reality level.

In the second section we stated, that only two variants of gravitational effect of the AE on micro-objects are possible. In the same section we considered the first of them –

the variant of the force action. In this section we have discussed the variant of informational action. Now we need to opt for one of them as corresponding to the reality on the metaphysical reality level. Remaining only within the analysis of the gravitational interaction it seems impossible, or rather difficult to opt for one variant from the two at the metaphysical reality level. For an unambiguous choice we should we should base on the results of comprehensive examination at the metaphysical reality level and on various aspects of the N-world functioning. These results are presented in [2]. Based on these results, we should accept the second variant - gravitational informational action of the AE on micro-objects as corresponding to the reality at the metaphysical reality level.

Section 4. In this section we discuss the ways of solving the paradox of constant and slowly changing fields which consists in contradiction between the micro-scale of the localization of electrically charged micro-particles and the macro-scale of elementary electric fields created by them. But first we discuss the questions associated with the notion of electric field in physics. It is commonly thought, that there is only one kind of the electric field. However it would make more sense to assume the existence of two kinds of the electric field: the negative one created by electrons and the positive one created by protons and other atomic nuclei. In general, under the electric field in physics a superposition of these fields is meant. Here we are interested in the following question: what is the scale of the elementary negative electric field created by the electron? An analogous question is raised in connection with the fields created by protons and other atomic nuclei. The presupposition for answering these questions is the relation between the forces of the Coulomb and gravitational interactions of micro-particles. In the case of the system "electron+electron" the first force exceeds the second one by $4,25 \cdot 10^{42}$ times and does not depend on the distance. This fact allows us to assume that the elementary negative electric field of the electron and, respectively, the elementary positive electric fields of the proton and other atomic nuclei should have the scale not less than that of the Hill sphere, by analogy with their elementary gravitational fields.

From the above, the electric field paradox can be specified as follows. This paradox consists in the contradiction between the scale of the localization of charged micro-particles and the astronomical scale of negative and positive elementary electric fields created by them. This clarification is of some importance, since it makes the paradoxes of the electric and gravitational fields similar and is solved in an analogous way. Firstly, this implies the rejection of the concept, according to that electric fields are produced (created) by micro-particles having electric charge: electrons, protons and other atomic nuclei. In other words, it should be recognized that micro-particles do not produce (do not create) electric fields around them. Secondly, it should be recognized that there are no electric fields as physical reality in nature. Claiming this we partially solve the electric field paradox. For its complete solution an alternative theory in this area at the metaphysical reality level is needed.

What in physics is described as the action of electric fields on electrons, protons and other atomic nuclei we will call the electrostatic interaction. Such an interaction is an empirical fact. As there are no electric fields in nature at all, we have to give an alternative explanation of the electrostatic interaction. This interaction is provided by Active Ether (AE), as well as the gravitational interaction. Making the AE responsible for the electrostatic interaction we achieve the complete solution of the electric fields paradox.

The electrostatic interaction consists of two components. The first component is the way of electrostatic action of the AE on micro-objects. The second component is the reaction of micro-objects to this effect. Let us first consider the first component. The AE controls the position of all micro-objects in its own coordinate system. It is a carrier of the electrostatic interaction algorithms. At the metaphysical reality level the notion of electric charge as a characteristic of micro-objects is conserved. The electrostatic interaction becomes possible if the balance between positive and negative charges is violated. In

physics it is assumed that under these conditions a continuum of the electric field appears. At the metaphysical reality level this field may be regarded only as imaginary. It is helpful to regard the strength vector first as a parameter of the imaginary electric field, and then, ultimately, as a parameter of the electrostatic interaction.

In the situations, which from the point of view of physics result in the appearance of the electric field, the AE shows electrostatic activity only in areas where the test charge is located. In other areas of the imaginary electric field it preserves the potential for such activity. To ensure the electrostatic interaction the AE calculates the vector of the imaginary field $\vec{E}$ as a superposition of vectors of the imaginary electric fields from every corresponding micro-object $\vec{b}$ – (2). The procedure for calculating the vector $\vec{E}$ is as follows. First the AE determines the vector $\vec{b}$ – (2) for all corresponding micro-objects in its own frame, then it decomposes it to three components according to its coordinate axes. After that it adds up the components of all the vectors $\vec{b}$ – (2) from all the micro-objects. As a result, it obtains the coordinate components of the vector $\vec{E}$ and then the vector itself. As there are no electric fields as physical reality in nature, the vector $\vec{E}$ calculated in this way represents a parameter of the electrostatic interaction.

Another procedure for calculating the vector $\vec{E}$ is theoretically possible. The AE can first determine the electrostatic potential at the point of interaction from every micro-object and then add up these potentials. Further it can calculate the vector $\vec{E}$ as a gradient of the total potential. However, analysis shows that the first variant for calculating the vector $\vec{E}$ described above is preferable.

Here, just like in the case of gravitation, we should note the following. The formula for calculating the vector $\vec{b}$ – (2) contains a divergence when $r \to 0$. It is not a problem for the AE. It excludes the calculation for that micro-object at the position of which the calculation of the vector $\vec{E}$ is performed. Certainly, it is the object to that the AE provides information in the form of the vector $\vec{E}$. The AE can exclude the neighbouring micro-objects from the calculation procedure of the vector $\vec{E}$ as well, without loss of accuracy.

The above method of calculating the vector of the electrostatic interaction is absolute. It is natural, that the AE can use optimized algorithms for calculating the vector $\vec{E}$ as well. It becomes evident, for example, when an electrically charged body has a regular geometric form - the form of a spherical surface, sphere, plane, cylindrical surface, and others.

Further, the key issue is the way of the electrostatic action of the AE on charged micro-objects. Here, as in the case of gravitation, only to variants are possible. The first variant is the force action:

$$\vec{F} = e\vec{E} \ , \tag{8}$$

where e is the charge of the micro-object. This force gives rise to the acceleration of the micro-object motion according to the Newton's second law (4). The second variant consists in the statement that the AE provides information to the micro-object in the form of the vector $\vec{E}$. At the metaphysical reality level, we consider the second variant from the two to be true, that is, the informational action of the AE on micro-objects having electric charge.

To conclude this section we consider the reaction of micro-objects to the informational electrostatic action of the AE. The micro-objects, just like the AE, are the carriers of the electrostatic interaction algorithm. This algorithm can be defined as follows. We have the obvious equality (8) and (4):

$$\vec{F} = e\vec{E} = m\vec{a} \ , \tag{9}$$

from which it follows that

$$\vec{a} = \frac{e}{m}\vec{E}$$
. (10)

Micro-objects transform the vector $\vec{E}$ into the acceleration vector $\vec{a}$ according to algorithm (10). Further it moves one step by itself according to algorithm (7). The AE provides information to micro-objects in the form of the vector $\vec{E}$ periodically, in the limiting case with the quantum interval of time ΔT.

Section 5. In this section we discuss the ways of solving the paradox of constant and slowly changing magnetic fields, which consists in the contradiction between the micro-scale of the localization of moving micro-particles having electric charge and the macro-scale of elementary magnetic fields produced by them. The solution of this paradox is analogous to that of the electric field paradox. Firstly, it implies the rejection of the concept that the magnetic field is produced (created) by moving micro-particles - electrons, protons and other atomic nuclei and ions. In other words, it should be recognized that such moving micro-particles do not produce (do not create) magnetic field around them. Secondly, in nature there is no magnetic field as a physical reality at all. Claiming this we partially solve the magnetic field paradox. For its complete solution an alternative theory at the metaphysical reality level is needed in this area.

What in physics is referred to as the magnetic field action on moving micro-particles we will call the magnetostatic interaction. Such an interaction is an empirical fact. As there is no magnetic field in nature, we have to give an alternative explanation of the magnetostatic interaction. This interaction is provided by the Active Ether (AE) just like the electrostatic interaction. Making the AE responsible for the magnetostatic interaction we achieve the complete solution of the magnetic field paradox.

The magnetostatic interaction consists of two components. The first component is the method of the magnetostatic action of the AE on moving micro-objects, the second component is the reaction of micro-objects to this action. Let us first consider the first component. Such an action becomes possible if micro-objects having electric charge move in the locally fixed (inertial) coordinate system. It is commonly thought in physics, that the continuum of magnetic field appears under this condition. At the metaphysical reality level it is useful to represent this field as imaginary, as there is no such field in nature. It also useful to imagine the intensity vector $\vec{H}$ as a parameter of this imaginary magnetic field, and then, ultimately, to imagine (to adopt) it as a parameter of the magnetostatic interaction.

The AE calculates the vector $\vec{H}$ of the imaginary magnetic field using the same method by which it calculates the vector of the electrostatic interaction $\vec{E}$. The next question concerns the way of magnetostatic action of the AE on moving micro-objects – electrons, protons and other atomic nuclei, as well as ions. Here, just like in the case of the gravitational and electrostatic interaction, only two variants are possible – the force action and the informational action. We consider the informational action to be true at the metaphysical reality level. The AE provides information to relevant micro-objects in the form of the magnetostatic interaction vector $\vec{H}$.

Further let us consider the reaction of micro-objects after they received information from the AE in the form of the vector $\vec{H}$. Micro-objects, as well as the AE, are the carriers of the magnetostatic interaction algorithm. This algorithm may be defined in the following way. It is commonly thought in physics that a moving micro-object in magnetic field experiences the action of the Lorentz force

$$\vec{F} = e[\vec{V}\vec{H}]$$
, (11)

where e is the electric charge of the micro-object, $\vec{V}$ is its velocity. We have an obvious equality (11) and (4):

$$\vec{F} = e[\vec{V}\vec{H}] = m\vec{a} \;,$$ (12)

from which it follows that

$$\vec{a} = \frac{e}{m}[\vec{V}\vec{H}] \;.$$ (13)

Micro-objects transform the vector $\vec{H}$ into the acceleration vector $\vec{a}$ according to algorithm (13).

The AE provides information to the micro-object in the form of the vector $\vec{H}$ periodically, in the limiting case with the quantum interval of time ΔT. According to (7) its velocity is

$$\vec{V} = \Delta L_{n-1}/\Delta T \;.$$ (14)

Substituting (14) into (7), we have

$$\Delta\vec{L}_n = \Delta\vec{L}_{n-1} + \frac{e}{m}[\Delta\vec{L}_{n-1}\vec{H}]\Delta T \;.$$ (15)

Formula (15) represents the algorithm of the stepwise movement of micro-objects under the magnetostatic interaction.

We have considered the magnetostatic interaction associated with moving micro-objects. However there are magnetic fields in nature, such as the Earth's magnetic field and the interplanetary one, the nature of which is not completely clear in the framework of physics. In our view the source of such imaginary magnetic fields is the AE. It is the AE who is able to provide such a large-scaled magnetostatic interaction around the Earth and in the interplanetary space. Of course, these interactions are components of the AE algorithms, which provide the functioning of the Solar system.

To conclude this section let us note that the question about the magnetic monopole stands no longer at the metaphysical reality level.

Section 6. Conclusion. First of all we pay attention to the following fact. The category of force in the second Newton's law (4) is primary and as a consequence acceleration $\vec{a}$ is secondary (cause-consequence). If we adopt the informational gravitational, electrostatic and magnetostatic actions on micro-objects as a primary factor, we will arrive at the loss of the primacy of the category of force. Moreover, it falls out from the structure of the theory of these interactions at the metaphysical reality level. At this level we have a replacement of the force action with the informational action. Further we should note that in formula (4) itself there is a possibility of ambiguous interpretation of the causation of the acceleration. In the framework of classical treatment, force is the cause of acceleration. According to the treatment at the metaphysical reality level acceleration of the body is primary, while force is just a brief notation for the product of mass and acceleration. Correspondingly, the interpretation of law (4) in classical physics should be regarded as the first starting level of cognition. At the same time the interpretation of this formula at the metaphysical reality level should be regarded as the next level of cognition.

In this paper we have considered G, E and H interactions at the metaphysical reality level only in the Solar system. The Active Ether (AE), a layer of the Inorganic world (N-world), is responsible for these interactions both in the Solar system and throughout the Universe. We note in passing that in [2] N-world is regarded as the order of three layers - the AE, Micro-objects and Radiation. For the Newton's law of universal gravitation to be satisfied in its absolute sense in the isolated Solar system, the AE must perform quite cumbersome calculations of the vector $\vec{a}$, namely it must take into account all the micro-objects of the system. However, it is possible to calculate the vector $\vec{a}$ using optimized algorithms taking into account the planetary structure.

In astronomy the laws of G-interaction in the Solar system are extrapolated to the entire Universe. In the framework of our approach, for the Newton's law of universal gravitation to be satisfied throughout the Universe, the AE must perform even more

cumbersome calculations, namely it must take into account all the micro-objects in the Universe. Most likely, the AE provides G-interaction on the basis of calculations with optimized algorithms for each stellar system in particular. Therefore, under the law of universal gravitation throughout the Universe the fulfillment of the law of gravity in each local system of celestial objects that make up the universe should be meant.

However, considering the G-interactions across the Universe, we should note that they are performed by the AE in accordance with its algorithms. In principle, these algorithms can contain different laws of G-interactions – both the attraction and repulsion with obvious or ill-defined regularities. These circumstances should be taken into account in astronomy and cosmology, in particular, in assessing the nature of speculation about the dark matter and energy in the Universe. Undoubtedly, these statements are made assuming that the Newton's law of universal gravitation is satisfied throughout the Universe. At the metaphysical reality level there is a possibility of interpretation of astronomical observations which have lead to the hypothesis about the dark matter as an instance of violation of the Newton's law of universal gravitation. Moreover, in our view, these anomalous astronomical observations provide a strong argument in favor of the concept of the Active Ether responsible for G, E, and H interaction in the world.

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