Journal of Current Trends in Physics Research and Applications

The Magnetomotive Force, Currents of Magnetic and Electric Charges in Static Superconductor and Them Vortex Spinor Fields

Robert A. Sizov[1]

[1]Physical and Mathematical Sciences, Individual Researcher, Russia

*Corresponding author: Robert A Sizov, Physical and Mathematical Sciences, Individual Researcher, Russia. E-mail: sizov.robert@gmail.com

Abstract

The study of magnetic scattering of neutrons in the structures of ferrimagnets, as well as the author's experiments with the separation of magnetic charges in dipole pairs ± g in magnetic field shown that magnetic fundamental particles are real structural components of atoms and substance. It is magnetic poles, and not the moving electrons are true sources of all magnetic fields and magnetic manifestations in Nature. The main reason ignoring of real magnetic charges, as well as true antielectrons in the world physical science for almost 150 years is the super-rigid conditions for confining these particles in compositions of substance which are radically different from confinement of electrons. In addition, the Maxwell's vicious concept of electric magnetism played very negative role here. The magneto-motive force (MMF), the magnetic analogue of EMF, obtained as result of the technology developed by the author of cryogenic enrichment of bodies with magnetic charges of the one sign, allowed him to realize direct current of magnetic charges in static superconductor. The field that forms around such current was detected by reaction of polarized ferroelectric arrow and with high degree of probability is vortex electric field rot**E**. This experience of the author, if we start from the nature of the current of charges, is a magnetic analogue of the well-known experiment of Oersted. The results of the author's experiments with real magnetic charges and their currents showed that physics of magnetic and electrical phenomena in the real World, in principle, correspond to their symmetry. As for of the so-called electromagnetic asymmetry so it refers exclusively to the selective (asymmetric) confinement of magnetic and electrical particles, but only in the compositions normal (non-superconducting) substance. The magneto-motive force obtained by the author was also used to create joint direct currents of magnetic and electric charges in a static superconducting solenoid. Eddy electromagnetic current which in this case is realized in a superconductor, manifests itself through the vortex electromagnetic (gravitational) field, which is described by the vortex vector rot [**E - H**]. This last field, according to its vector characteristics, is a ferrogravitational field and is experimentally detected through the act of gravitational repulsion (not attraction) of an experimental cargo from a superconducting solenoid in which electromagnetic current is realized. The noted repulsion is widespread in Nature effect of the gravitational (ferrogravitational) levitation which was discovered and investigated by the author of this article.

Keywords: Magnetic Charges, Magnetons, Antimagnetons, Magnetic Dipoles, True Antielectrons, S-Gravitons, Gravitational Field, Ferro-and Paragravitation, Gravitational "Dark Energy"

1. Introduction to physics of real magnetic charges in atoms and substance

The author's experimental and theoretical studies which have been carried out since 1968 have shown that real magnetic poles (magnetic charges) are structural components of atoms and substance. It is magnetic poles (magnetic charges), but not moving electrons, are the direct sources of all magnetic fields and magnetic manifestations in Nature [1-6].

The charges of magnetic spinor particles (g) which together with electrons and true antielectrons form the electromagnetic shells of atoms meet condition g = e where e is the electron charge [7]. The magnetic charge with negative sign g- received author's name **magneton** (not to be confused with the so-called Bohr magneton). By antiparticle to magneton is the **antimagneton** with positive magnetic charge g+. The main state of fundamental magnetic charges in Nature, and as well as electric charges, is its existence in composition of corresponding **bispinors** which most often appear in form of **dipoles** [8].

Under the influence of electric current J_e the vortices of above-mentioned magnetic dipoles are realized in conductor which are described by the expression rotJg, and equation of the process of their formation has the form: $k_1 \mathbf{J}_e = \text{rot} \mathbf{J}_g$ (1). It is the vortices of magnetic dipoles untwisting in conductor under the influence of electric current are direct sources of the vortex magnetic field rotH the formation of which is described by equation $k_2 \text{rot} \mathbf{J}_g = \text{rot} \mathbf{H}$ (2). The well-known, so-called first Maxwell's equation $k \mathbf{J}_e = \text{rot} \mathbf{H}$ (3) is extremely erroneous, since it includes in one action two physically different processes mentioned above. This equation appeared as a result of primitive-superficial impression of Great Theoretician from the famous Experience of Oersted [9, 10].

When the current of magnetic charges passes through a superconductor, due to the close conditions of confinement of magnetic and electric charges and, as a consequence, the symmetry of electromagnetic manifestations vortex electric field is formed around the magnetic current which within the Maxwell representations has the form $k \mathbf{J}_g = rot\mathbf{E}$. If place an electric arrow near a superconductor with a current of magnetic charges $\mathbf{J}_g$, then we get experiment that is the magnetic analogue of the Oersted experiment.

However, as noted above, this last equation, like Maxwell's first electromagnetic equation (3), is erroneous, since it includes in a single action two different physical processes described by the following equations $k_1 \mathbf{J}_g = rot\mathbf{J}_e$ (4) and $k_2 \, rot\mathbf{J}_e = rot\mathbf{E}$ (5), where $rot\mathbf{J}_e$ is the eddy current of electric charges formed by rotating electric dipoles in the composition: an electron and **true antielectron**.

It is important to note that the true anti-electron presented in the paper is neither a positron nor a Dirac hole. These last notions are, exclusively, forced theoretical surrogates, the formation of which is determined by the secular vicious ignoring in physics of real magnetic charges actually existing in atoms and substance, as well as true antielectrons [11, 12].

The mechanisms of formation vortex electric ($rot\mathbf{E}$) and magnetic ($rot\mathbf{H}$) fields in conductor, respectively, with magnetic and electric currents are shown in Figure 1.
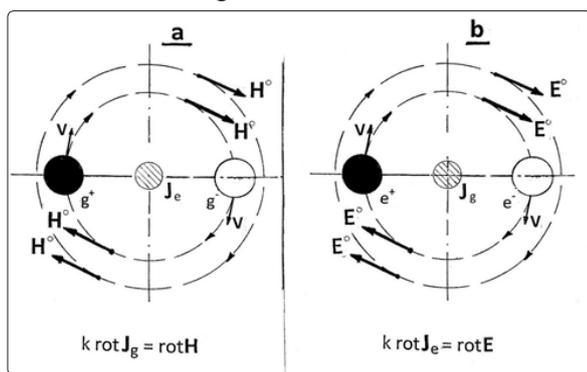

Figure 1: Schemes of mechanisms formation of vortex spinor fields: magnetic (a) and electrical (b). By white circles on the Fig. 1 showed negative charged electric and magnetic spinors: electron (e⁻) and magneton (g⁻), and black circles are positively charged antispinors corresponding to them with charges e⁺ and g⁺. The classical equations of the processes formation vortex magnetic and electrical of fields also shows in Fig. 1. The circles attached to the fields vectors ($\mathbf{E}°$ and $\mathbf{H}°$) in Fig. 1 emphasize their vortex nature.

The first person to experimentally observe real magnetic charges in a substance was the remarkable Austrian physicist Felix Ehrenhaft. Based on the results of his research which lasted for more than 40 years, he published about 30 articles in physical journals [13]. It is important to note that Ehrenhaft's experiments were repeated by numerous followers who confirmed his results and conclusions (see, for example, [14]).

The Ehrenhaft experiments are a magnetic analog of well-known Milliken tests from determining the value of the electron charge. Very small particles of solids substance were placed in a vertical uniform magnetic field free of residual electrical charges. The particles were illuminated by concentrated beam of light. The optical system allowed to determine the parameters of the particles movement. The basic experimental result of investigation Ehrenhaft

consisted in the fact that it was found a logical movement of particles along power lines of the magnetic field. With the change in the direction of the field, the direction of movement of the particles also was changed. According to conclusions Ehrenhaft motions of particles, that observed in his experiments, are determined their charging by the magnetic charges of different signs. It is important to note that the minimum magnetic charge on particles of substance, which was noted in the studies of Ehrenhaft was in magnitude very close to the charge of electron.

Experimental and theoretical studies of the author this article which, with breaks, are held with 1968 have shown that electrons and magnetic charges in a normal conductor are under conditions of radically different physics of them confinement. Electrons populate real conduction bands which allows them to participate in the composition of the electric current. As for magnetic charges that are not included in atomic structures they are in potential zones of conduction and their movement in normal conductor is possible only in the processes of noted rotations of magnetic dipoles around the lines of electric current.

However, the situation with the confinement of magnetic charges in conductors, changes dramatically under conditions of superconductivity when these charges leave potential zones and pass into real conduction zones. In this case, magnetic dipoles, in the process of their rotation around the electric current lines, do not experience "friction" against lattice of the superconductor what and determines its zero electrical resistance or superconducting effect. It is important to note that such fundamental particles as true anti-electrons (e⁺) in normal conductors are in hard confinement conditions, as are magnetic charges.

The author's research has shown that the positron is not an antielectron, as it follows from modern physical concepts since represents the mass, i.e. atomic-like structure. As for the true antielectron, it "sits" in the positron as a nucleus and determines its positive charge e⁺ [15].

The conditions for the confinement of electric and magnetic charges in a substance are presented in Figure 2, which shows the layout of the levels of electrons, true anti-electrons and magnetic charges (magnetons and antimagnetons) on the energy scale. As you know, electronic levels are in a potential "well" and for an electron to come out into a free state from connection with the conductor lattice, it is necessary to increase its internal energy, for example, by heating. As for the magnetic charges and true anti-electrons, their energy levels are located under the potential "dome" and for these particles to enter the free state, the substance should be cooled, i.e. reduce his internal energy.
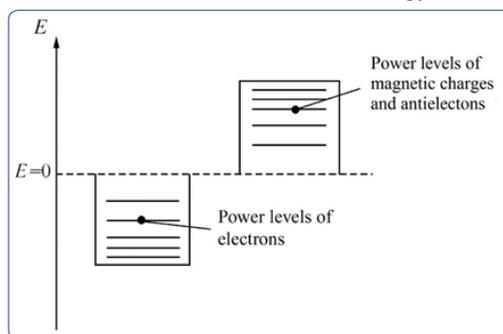

Figure 2: Schematic diagram of the location on the energy scale of the levels of electrons (in the **energy well**) and magnetic charges with true anti-electrons (under the **energy dome**).

At deep stages of cooling some substances, their superconducting state is realized, which is associated with the transition of magnetic charges and true antielectrons into a state free from coupling with the superconductor lattice. It is the conditions of the confinement of magnetic spinor particles in substance noted above that played very "cruel joke" with the physical theory which manifested itself, for example, in the form of Maxwell's vicious electric magnetism [16].

From Fig. 2, it is easy to see that the growth internal energy of body contributes to the confinement of magnetic charges and true anti-electrons in the lattice and, at the same time, squeezes out electrical spinors from the substance, for example, electrons. A striking example of the latter process is the cathode emission of electrons.

Thus, the fascination with high energies, which has taken place in fundamental physics in the last 50 - 70 years, for the reasons noted above, contributed to the preservation of a negative attitude of physicists to the possibility of the existence of real magnetic charges in compositions of atoms and substance.

It is important to note that the vicious ignoring of real magnetic charges, as well as true electrons did not pass without trace for existing physical theory. These unrecognized fundamental particles were perforce replaced more or less by suitable theoretical surrogates. For example, magnetic charges in atomic shells were substitute with such "fig leaves" as the magnetic moments of electrons, and the true antielectrons by Dirac holes or electron vacancies. The famous Dirac monopole, according to the author of the article, should also be attributed to the above-mentioned surrogates-substitutes for magnetic elementary particles [17, 18].

2. Vortex electromagnetic (gravitational) field and Physical Mass with real magnetic charges

The results of the experiments presented in the article, as well as other experimental and theoretical studies of the author allowed him to establish the physical parameters and the place of real magnetic charges in the structures of atoms and substance. For example, the author showed that atomic shells consist of electric and magnetic spinor particles the charges of which meet the condition $e = g$, and the shells themselves are electromagnetic, not purely electronic, as has always been believed (see [7]). It is also important to emphasize that the number of magnetic spinor particles in atomic structures is, approximately, equal to the number of electrical particles. It is the electromagnetic shells of atoms that are natural sources (generators) of the gravitational field, which, in reality, is a vortex electromagnetic field.

The elementary source of the gravitational field in the composition of atomic shells is a spinor electromagnetic quasiparticle, which received the author's name S-Graviton (S from engl. the source). The S-Graviton contains two spinors (an electron and magneton) and two corresponding antispinors. It can be represented as the copula of magnetic and electric dipole revolving in antiphase in the same atomic orbit. This quasiparticle can also be represented in the form of two joint antiphase orbital currents of electric and magnetic charges.

The above-described model of an elementary vortex EM - current or S-Graviton can be written in mathematical form as: rot [$\mathbf{Je} - \mathbf{Jg}$], where $\mathbf{Je}$ и $\mathbf{Jg}$ are the vectors of the instantaneous current density of electric (e) and magnetic (g) charges corresponding to their vortex (circular) flows. Then the equation of the process of

formation of the vortex electromagnetic (gravitational) field is written in the following form:
$k \, \text{rot}[\mathbf{Je} - \mathbf{Jg}] = \text{rot}[\mathbf{E} - \mathbf{H}]$ (4), where $\mathbf{E}$ and $\mathbf{H}$ are the vectors of instantaneous electric and magnetic field strengths at each point of the gravitational field, and k is the proportionality coefficient. The vortex electromagnetic vector $\text{rot}[\mathbf{E} - \mathbf{H}]$ corresponds to elementary quantum of the gravitational field emitted by one S - Graviton.

The minus signs, set in the above equation of the process of formation of the gravitational field (4), correspond both to the antiphase relation between the eddy currents of electric and magnetic charges in the S-Graviton, and to the antiparallel orientation of vectors of instantaneous strengths electric and magnetic fields at each point of the gravitational field. It is the minus signs, set in the above equation (4), that correspond to the minimization of "**Dark energy**", which is realized in the Energy-phase under the influence of the fields of the S-graviton, presented in the article [19].

Thus, in contrast to the vortex magnetic field, each point of which corresponds to one vector of instantaneous intensity $\mathbf{H}$, each point of the elementary gravitational field corresponds to two vectors of instantaneous field strengths $\mathbf{E}$ и $\mathbf{H}$, equal in magnitude and directed antiparallel to each other.

Schematic diagram of the formation of a vortex electromagnetic (gravitational) field is shows on Figure 3. Unlike, for example, from vortex magnetic field (see, Fig. 3a) by every point of which is answered one vector of instantaneous tension of $\mathbf{H}$, by every point of the elementary gravitational field is responsible two vectors of instantaneous tension of fields of $\mathbf{E}$ and $\mathbf{H}$ equal by value and oriented antiparallel to each other (Fig. 3b).
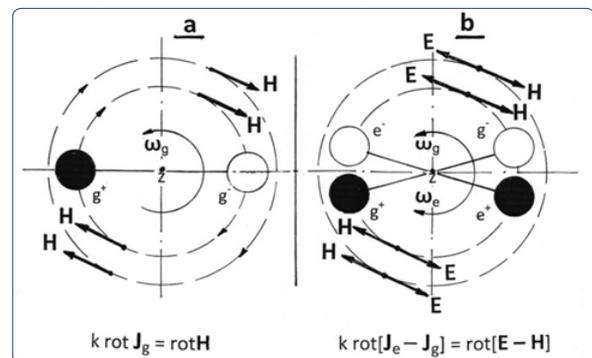

Figure 3: Schemes of mechanisms formation of the vortex fields: magnetic field (rot$\mathbf{H}$) Fig. 3a and electromagnetic (gravitational) field (rot[$\mathbf{E} - \mathbf{H}$]) Fig. 3b. By white circles on the Fig. 3 showed negative charged electric and magnetic spinors: electron (e⁻) and magneton (g⁻) and black circles - positively charged antispinors corresponding to them with charges e+ and g+. The classical equations for the formation of vortex fields are also shown in Fig. 3.

If polarization of vortex vectors rot [$\mathbf{J}_e - \mathbf{J}_g$] of S-gravitons is realized in the structures of physical masses (atoms, nucleons, substance, etc.), what is accompanied by polarization of vortex vectors rot[$\mathbf{E} - \mathbf{H}$], then in analogy with magnetic fields ferromagnetics the gravitational fields being emitted by these masses can be called a **ferrogravitational** fields (FGF). The gravitational field formed by physical masses in the absence polarization of the vortex vectors of s-gravitons in their structures is a tensor or quasi-scalar field. And again, in analogy with magnetism, such field can to define as paragravitational field

(PGF). Vector conditions corresponding to these fields are written in the following form: <rot[**E - H**]> ≠ 0 for **ferrogravitational** field and <rot[**E - H**]> = 0 for the field **paragravitational** [20].

Since 2001 (see, [2]), the author in his publications tried to explain that all varieties of Physical Mass (PM) are electromagnetic atomic-figurative structures, consisting of electric and magnetic spinor particles. One of the main characteristic properties of all varieties of PM is their ability to emit a gravitational field that is formed as the result of a joint orbital currents of electric and magnetic charges and is the vortex electromagnetic field.

Thus, all types of Physical Mass (atoms, nucleons, substance etc.) are dynamic electromagnetic structures that emit a gravitational field and consist of electric and magnetic spinor particles. In other words: everything that creates a gravitational field is Mass. If magnetic poles (magnetic charges) are removed from the FM composition, then only electric particles will remain in this "place" which themselves are not able to form either mass or gravitational field.

At the same time, in modern mathematical physics, in conditions of complete disregard for real magnetic particles, the function of endow particles Mass entrusted to Higgs field, the quantum of which is his known boson [21]. The paradox of the situation with such "endow" is that the existing representation of mass is purely mathematical. Any real, general physical representation of the essence of FM is absent in modern physics. Therefore, the process of imparting mass to spinor particles is also mathematical and, as shown by the research of present author, has nothing to do with reality.

It is important to emphasize that **Physical Mass** (atoms, substance and others) and for example, **Matter** are completely different physical categories. The physical masses are, for example, nucleons and atoms. It is important to note that the individual spinor particles, as electric so and magnetic are massless because the mass is the result of their joint "structural operations". For example, the electron is massless particle and no "divine bosons" can't give him Mass. It should also be added that substance, atoms, nucleons i.e. the physical masses cannot be identified with Matter, as is now accepted in modern physical science.

The physical masses, emitting ferrogravitational field is push off from sources paragravitational field, for example, from the Earth. The last action is a manifestation **gravitational levitation** effect, which was first discovered by the author of this article and very widely distributed in Nature. In principle, such effects as a volatility of atoms (molecules) of light gases, for example, hydrogen and also convectional processes in liquids and gas media should be also attributed to the gravitational levitation manifestations. The fact of participation of the gravitational levitation in the volatility of atoms (molecules) of hydrogen was detected in the experiment performed by the author of this article (see, [22]). The levitation forces, which is caused by natural ferrogravitational fields, emitting by cells, are responsible for vertical growth (development) of plants and trees, as well as maintain them in an upright position. Namely, the forces of gravitational levitation are responsible for the amazing "aerobatics" of bumblebees, and also allow swifts and migratory birds to stay in the air for a long time.

In the late seventies (1979), the author managed to obtain an experimental gravitational field using the inertial forces of magnetic and electric charges under conditions of untwisting a coil with a closed winding of a superconducting wire (see, [4]). The fact that magnetic charges have the property of inertia is evidenced, for example, by the effect of self-induction. The fact that after removing the electrical voltage in the conductor for some time the electric current is maintained, according to the author, is determined by the inertia of magnetic charges in the eddy dipole currents involved in the self-induction process according to the equation k rot$\mathbf{J}_g$ = $\mathbf{J}_e$.

Results of experiments author with magnetic charges and their currents in superconductors will allow him to develop technology to produce of the technical ferrogravitational field (FGF). Technical FGF and levitation forces formed by them can be used in transport, lifting and space engineering, in power engineering, as well as in numerous Gravito-Physical and Gravito-Chemical technologies (see publications author's [23 - 24]).

3. The technology of charging bodies magnetic charges of same sign and enriching resulting magnetic charging

With 1981–2000, the author, with long breaks, was engaged in the development and testing of relatively simple and inexpensive methods and devices for enriching of bodies by magnetic charges. These works allowed him to significantly (more than 103 times) increase the magnetic charge of the experimental bodies in comparison with the primary charge obtained in previous experiments.

The article presents the stages of the author's experimental works on the creation of the primary magnetic charging of the experimental bodies and enrichment of the received charging, as a result of which a significant the magnetomotive force (MMF) was obtained which makes it possible to realize a direct current of magnetic charges in solenoid out of superconducting lead wire. This current manifested itself through the vortex electric field described by the vortex vector rotE. The latter experiment is the magnetic analogue of well-known experiment of Oersted if we proceed from the magnetic nature of the charges in the composition of the current.

3.1 Primary charging of layers (particles) of lead with magnetic charges and their division into two differently charged groups

The technology, as a result of which particles (layers) cut off from the surface of lead blanks in an external magnetic field were charged with magnetic charges is shown in Figure 4.

The lead blank 1 with a working part diameter of 30 mm and a thickness of 15 mm had a flange designed to be fixed on the pole of an electromagnet 2. In an external magnetic field (5 - 7 kOe) was layer the cutting of lead blanks by special cutters 3. The cutters were mounted on a stainless steel disc (not shown in Fig. 4) which was rotated by electric motor with reducer.
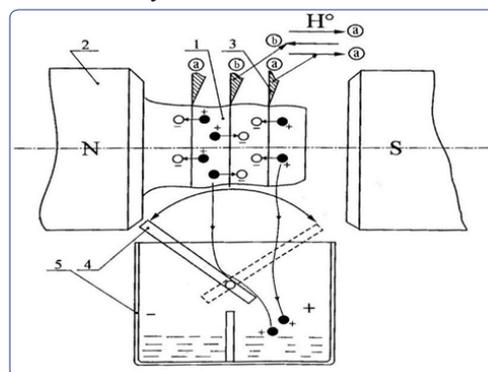

Figure 4: Schematic diagram technology of primary charging of lead particles with magnetic charges and separation of charged lead masses into two differently charged groups

The cut off layers of lead were poured into the bin 5. Depending on the direction of the external magnetic field (shown in Fig. 4 by arrows with letters a and b), the cut off lead particles were charged with magnetic charges of different signs. To separate the differently charged masses of lead after cutting, the shutter 4 was installed in the bunker, the position of which was rigidly connected with the direction of the magnetic field, i.e. with the sign of charges in the cut off masses of lead.

The noted diameter of the primary work-pieces, as well as subsequent mono-compacts charged with magnetic charges (30 mm), was determined by the dimensional parameters of the electromagnet and, above all, by the diameter of its poles (65 mm). A serious problem within the framework of this technology for cutting layers of lead in a magnetic field was to ensure reliable fastening and prompt replacement of work-pieces. The method of fastening the MC adopted by the author with the help of a special flange, which is inserted into the corresponding "pocket" on the pole of the electromagnet, turned out to be very successful.

It should be noted that the rotary technology of primary charging of the lead mass with magnetic charges, which was carried out at 20 ° C and in the atmosphere, after a long process of its optimization, turned out to be quite efficient. This technology made it possible in a relatively short time (approximately, within one working week) to receive up to 15 - 20 kg of lead mass with magnetic charges one sign for subsequent enrichment. In addition to the above-described rotary technology for cutting layers in a magnetic field, the experiment tested a technique with a rack-and-pinion method of cutting, but the rotary version, which was tested in several technical solutions, turned more effective.

We emphasize there that the signs of the magnetic charges on the lead particles, obtained as a result of the technology described above, were set in accordance with the direction of the external magnetic field at the moment of cutting of the lead layer.

Among the serious technical problems that the author had to solve when carrying out work within the framework of the described technology, it should be noted: adhesion of lead to the blades of cutters and the shutter, regulation and stabilization of the thickness of detachable layer, as well as the fixation and efficiency of changing lead work-pieces at the pole of the electromagnet. It is also important to note that a large amount of work with lead required the implementation of protective measures against contact with this harmful substance.

Since the value of the primary charging of the lead mass by magnetic charges, obtained within the framework of the technology described in Section 3.1 is very small in order to achieve the set goals, it was necessary to significantly enriching it. The technology for enriching the magnetic charge of lead mono-compacts, developed by the author and presented in the article, made it possible to increase the magnitude of the magnetic charge of the experimental bodies by 3 - 4 orders of magnitude and to perform simple and demonstrative experiments with magnetic currents in a superconductor.

3.2 Melting of a lead mass charged with magnetic charges of the same sign to form mono-compacts (MC)
The lead mass charged with magnetic charges of the same sign, obtained as a result of performing stage 3.1, was placed in a stainless multi-position mold and melted in a reducing atmosphere

(hydrogen), acquiring the shape of a disk with a diameter of 30 mm, with protrusions (flanges) intended for fastening to the pole of an electromagnet. After complete melting of the charged charge and holding for 15 minutes at 350°C, the castings were slowly cooled with a furnace to room temperature. After removing from the mold, lead discs or mono-compacts were pruning on lathe eat to working part thickness of 10 - 15 mm, and then marked in accordance with the sign of their magnetic charge.

Note 2. The melting of the charged lead mass and the formation of mono-compacts within the framework of this technology was carried out on the basis of a powder metallurgy enterprise.

3.3 Cryogenic enrichment of surface layers of lead mono-compacts by magnetic charges of the same sign
The mono-compacta, i.e. lead disks obtained as a result of stage 3.2 were collected in stacks (assemblies) of 12 - 15 disks in each in accordance with the sign of their magnetic charges, as shown in Figure 5 (the order of signs of the disks' charge in assemblie: + – – + + – – + + etc.). Then the stacks of disks were placed in a helium cryostat 2 with an inner (helium) vessel diameter of 130 mm, in which, in addition to the disks, a coil was installed-solenoid with a copper wire winding.

The use of cryogenics in the present studies assumed that during the transition of lead mono-compacts to the superconducting state, the unpaired magnetic charges, which determine the magnetic charge of each MC, pass from potential in real conduction band. In this case, these magnetic charges in the disk are allowed to move freely in its volume and, as a result of magnetostatic interaction with the charges of the opposite sign of the neighboring MC, they will collect at the surface facing the neighboring disk, which charged by the magnetic charges of the opposite sign. This latter process is the magnetic analogue of known electrostatic interactions.
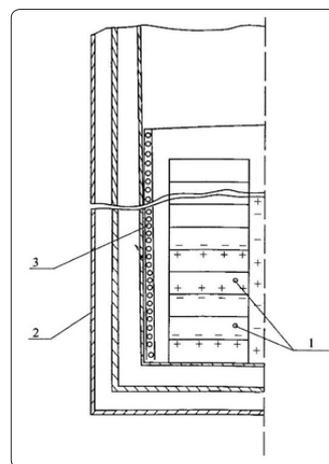

Figure 5: Schematic diagram of the cryogenic enrichment process of the magnetic charges of the surface layers of lead disks (mono-compacts).

Upon subsequent heating of MCs above the superconducting transition temperature (for lead, it is 7.2°K), the MC material transitions to the normal state which rigidly fixes the magnetic charges of interest to us in thin near-surface layers thickness presumably 0.1 - 0.3 mm. As a result of this cryogenic enrichment process the density of unpaired magnetic charges in the indicated layers of the disks can, theoretically, increase by more than 20 times compared to the charge of the initial MC.

If the layers enriched within the framework of this cryogenic technology are mechanically cut off from the disks and, according to the methods described above (see stage 3.2) to form new disks which can be called the second generation, and the following ones - the third generation, then we constantly receive a product for subsequent effective cryogenic enrichment.

However, taking into account that in reality the cut layers had a thickness of 0.3 - 0.5 mm, as well as other possible overlays, the effect of enrichment of the lead mass with magnetic charges within one generation was estimated by us as ~ 10 times. After cryogenic enrichment, the side (layer) and the sign of the magnetic charge were marked on each MC.

Let us explain the function of the copper wire solenoid mentioned above. Its participation in cryogenic enrichment processes is due to the author's desire to insure himself in case the unpaired magnetic charges do not "want" to move to the disk surface within the conditions magnetostatic "hooked" on the paired (dipole) magnetic charges. Therefore, the use of an alternating EM field of a solenoid supplied with an alternating current with a frequency of 50 hertz should, according to the author, bind the dipole magnetic charges in the conduction band and tear them away from the divorced charges. Note that the solenoid, in the process of cryogenic enrichment, was switched on for a very short time of 5 - 7 seconds, two - three times during the period of holding the MC in a bath of liquid helium.

3.4 Mechanical cutting off layers enriched with magnetic charges from mono-compacts after cryogenic enrichment
After each stage of cryogenic enrichment, the layers of the MS enriched with magnetic charges, were cut off using the device described above in section 3.1, but without turning on the magnetic field. The lead mass obtained after the next cutting then went through a new stage of melting and cryogenic enrichment. In total, as a result of the described activities of the author, more than 1500 primary and subsequent MCs were manufactured.

This amount of lead used shouldn't be intimidating because almost all lead was of returnable, and for complete cycle of creating one output mono-compact taking into account all possible costs for about 100 primary mono-compacts and required maximum 70 - 80 kg of initial pure lead. As a result, out of the total number of MCs, only 14 output disks were manufactured with the maximum magnetic charge (7 disks of each charge). According to the author's estimate, the charge of the output MC can exceed the primary charge of mono-compacts by more than 10^3 times.

Output or experimental MCs were melted in the form of disks 30 mm in diameter and 8 mm thick (without the formation of flanges) in a reducing atmosphere. To connect the output MCs to an external circuit (solenoid), each disk had a "tail" with a transverse dimension of 2.5 x 2.5 mm2 and a length of 15 mm. The connection of the output MC charged with magnetic charges with the conductors of the external circuit, which had a diameter of 1 mm, was carried out in a special ceramic mold and in an inert atmosphere (gaseous nitrogen).

Note 3. In conclusion, we note that the work associated with cryogenic enrichment of the lead mass turned out to be very costly both in terms of labor intensity and cost. The latter was determined by the problems with the acquisition of liquid helium by the author. In many ways, this is why the period of cryogenic enrichment described in the article dragged on for more than 15 years. It should be added that the effectiveness of the above mentioned copper solenoid in cryogenic enrichment processes is not proven, since the author did not specifically check it, acting on the principle - "it shouldn't be worse".

3.5 Testing magnitude of the magnetic charge of MC on a school torsion balance
In the processes of performing the described stages of enriching MC (disks) with magnetic charges, as well as before connecting them to an external circuit (to solenoid) to implement the current of magnetic charges, they were tested for magnitude magnetic charge using of school torsion balance. Since this balance was a rather crude device, the necessary technical improvement was made for their use, described in detail in (see [6]). The magnitudes of the magnetostatic interaction forces between MC observed in this testing, according to a very rough estimate by the author, could be in the range from 0.5 to 1 dynes which is more than 10^3 times greater than the forces noted by the author in his previous experiments with the Coulomb torsion balance (see [4]).

As noted above as a result of testing, for subsequent experiments with currents of magnetic charges, 14 MC was chosen, i.e. along seven of disks of each sign of magnetic charge, since they showed the fact of their significant charging during testing.

Note 4. Very useful information for those who decide to repeat the author's experiments is his observation that all operations with a charged lead mass which performed within the framework of this technology, i.e. the shearing off of layers from the disks, the melting of the lead mass in a reducing atmosphere, as well as oxidation processes that are very significant for lead did not have a significant effect on the value of the magnetic charge of lead MCs. The results of testing the magnetic charge on of lead mono-compacts showed that its remained unchanged for months and even years. The latter circumstance is, apparently, the only advantage of magnetic charges over electrons, in terms of work with their participation in experimental studies.

4. Experimental current of magnetic charges in static superconductor and vortex electric field rotE.
The assembly, consisting to two lead MC with different signs of their magnetic charges and a conductor connecting them, is a magnetically charged circuit, ready for the implementation of direct current of magnetic charges. However, the real current of magnetic charges in such a circuit is possible only if the source and all conducting elements of the circuit are in a superconducting state. Consequently, a magnetically charged assembly in normal state can retain a magnetic charge and the ability to realize a magnetic current for unlimited time.

A diagram of the experiment on realizing the current of magnetic charges in a superconducting wire wound on a coil is shown in Figure 6, which shows the lower part of a metal (helium) cryostat 1, which are usually used in research with superconducting solenoids. The inner diameter of the helium vessel is 130 mm. The cryostat housed an assembly consisting of 2 mono-compacts 3 charged with magnetic charges of different signs connected by a lead wire 4 with a diameter of 1 mm wound on a coil 5 made of carbon fiber. The weight of each MC was ~ 80 g, and the total weight of lead wire used in the assembly was ~ 100 g.
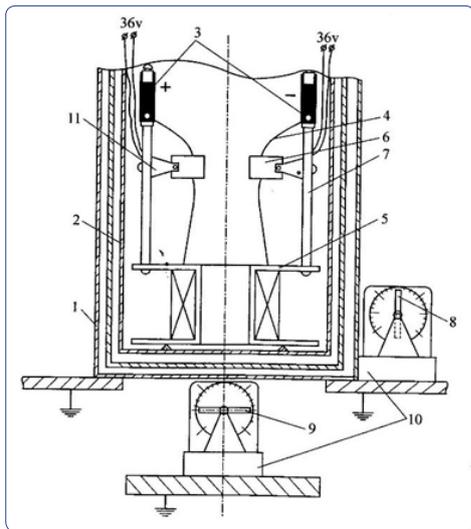
Figure 6: Scheme of experiments on implementation current of magnetic charges in a superconducting solenoid and registration of observed in this case of vortex electric field rotE.

To prevent the unregulated passage of the current of magnetic charges through the winding when the assembly is cooled to the temperature of liquid helium (4.2 °K), zones (belts) with a normal state of lead were created in the conductor above the coil. The latter condition was provided by thermal couplings 6 made of carbon fiber with small nichrome spirals which were supplied with an alternating current of 36 V. The operating current used in the heaters of clutches was selected empirically and provided the temperature of normal zone in a bath with liquid helium 15 - 20°K. The time of the transition of the normal zone to the superconducting state when turned off heaters of thermal couplings was estimated as 5 - 7 seconds.

To detect the possible effect caused by the passage of the current of magnetic charges through the coil winding, two arrows made of polarized ferroelectric (barium titanate – $BaTiO_3$) 8 and 9 were installed near the cryostat. Arrows with dimensions 3.5 x 3.5 x 34 mm^3 rested on needle supports and were placed near the cryostat as shown in Fig. 6. In addition, in blocks 10 with arrows were installed the graduated scale to determine the angles of rotation of the arrows in case of realization of the expected effect. All metal parts, including the case of the arrow blocks, were carefully grounded.

The technology of the experiment was as follows. In the process of filling the cryostat with liquid helium, at the moment when the MC temperature reached 25 - 30°K (measured with a germanium resistance thermometer), included of electric current which passing through of heaters of thermal couplings. After the cryostat was completely filled with liquid helium to a level exceeding the top of the assembly, the entire system was held ~15 - 20 minutes to equalize the temperature. Then disconnected electric current going through the heaters of thermal couplings was turned off and all attention was paid to the reaction of the arrows.

In total, within the framework of this technology, two experiments were carried out, in each of which two pairs of MCs out of seven were used, obtained as a result of the above-described magnetic charged enrichment.

Results of Experiment I. The results of two attempts to implement current of magnetic charges in the framework of the described experimental technology turned out to be negative. In none of the attempts carried out, there was observed any reaction of the arrows to the possible passage of a current of magnetic charges through of the superconducting solenoid.

Discussion of the results of Experiment I. The reason for the negative result within the described Experiment I, according to the author, may be the effect of diaelectricity arising in the metal walls of the cryostat and, especially, in the copper screen and preventing exit of the vortex field rot**E** to the arrows. This effect is the electrical analogue of giant diamagnetism in superconductors (the Meissner effect). In the conduction band of metals, there are a large number of electric charges are part of electric dipoles, which are able to screen the external electric field rot**E** and form the so-called the electric Meissner effect.

For this reason, the vortex electric field, if it is realized within the framework of this experiment, cannot go beyond the metal walls of the cryostat. In order to detect this field, it is necessary to remove conduction electrons located in the metal walls of the cryostat on its way to the arrows. A glass cryostat could be an ideal solution to this problem, but the author did not have such capabilities.

Ultimately, the cryostat described above was significantly altered (see Fig. 6) in which special optical glasses 1 with a diameter of 40 mm were mounted in the bottom of the helium vessel and the bottom of the outer casing (shown in Figure 7).
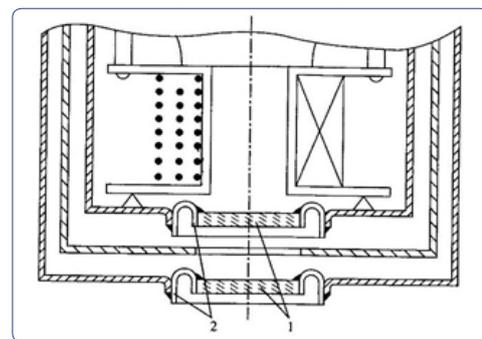

Figure 7: Diagram of the reconstructed part of the cryostat which ensured the exit of the vortex electric field rot**E** beyond its limits.

The glasses were glued into cupronickel clips 2, which, using a special solder, were soldered into the bottom of the inner and outer vessels of the cryostat. In addition 40 mm hole was made in the bottom of the copper shield. The winding of the solenoid was also modernized in which loose winding of the wire was implemented, which, according to the author, should help to reduce the possible dielectric screening of the vortex field rot**E**. It was with the use of the modernized cryostat described above that the author carried out the effective Experiments II, the description of which is presented below.

Results of Experiment II. The results obtained in framework of Experiment II with the passage of a direct current of magnetic charges are shown in Figure 8. The numbers of builds with MC (1, 2) used in each experiment are shown along the horizontal axis. The vertical axis shows the angular degrees of rotation of the ferroelectric arrows from the initial position. The dashed circles mark the angles of rotation of the lower arrow 9 observed in the experiment at the moment of the passage of the magnetic charge current through the solenoid. As for the upper arrow 8, no it reaction to the passage of the current of magnetic charges was

noted. From Fig. 8 it can be seen that both experimental builds № 1 and 2 used were effective. The reaction of the lower arrow 9 which was located against the optical glasses, was 25 angular degrees in the case of builds №.1 and 8 degrees for builds №. 2. The dynamics of the indicated turns of the arrows in the experiment was smooth and realized within 2 - 3 seconds.
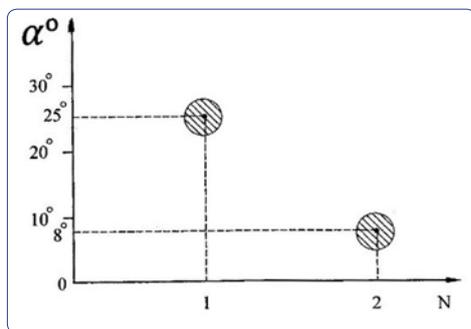

Figure 8: Experimental results of the effect of the vortex electric field rot**E** on the lower ferroelectric arrow in experiments with a constant current of magnetic charges in a static superconducting solenoid.

Discussion of the results of Experiment II. The experimental results presented in this section support the author's assumption that a vortex electric field rot**E** is realized around the current of magnetic charges Jg in a superconductor. This last field is obtained as a result of the implementation of not one, but two sequential processes: $\mathbf{J}_g \rightarrow \text{rot}\mathbf{J}_e \rightarrow \text{rot}\mathbf{E}$, i.e. in the first process, the current of magnetic charges spins up the electric dipoles according to the equation $k_1 \mathbf{J}_g = \text{rot}\mathbf{J}_e$, which in the next process form the vortex electric field observed in this experiment (the last process is written in the form: $k_2 \text{ rot}\mathbf{J}_e = \text{rot}\mathbf{E}$). It is the vortex electric field rot**E**, which is an electric analogue of the vortex magnetic field rot**H** and is formed around the current lines of magnetic charges in the conductor, that has the observed effect on the ferroelectric arrow. It is easy to see that in all its details and manifestations this experience with electric arrow is a magnetic analogue of Oersted's experiment with a magnetic arrow.

Another argument in favor of the formation of the field rot**E** in the framework of experiment II is that this field managed to extract from the cryostat and direct it to the lower arrow 9 through optical glasses. As for the upper arrow 8, it was in the zone of its shielding by the metal walls of the cryostat and did not come under the influence of the vortex electric field.

The forces acting on the arrows in this experiment depend primarily on the magnitude of the magnetic charges current, the degree of electric polarization of the arrows and the friction between the needles - the arrow holders and supports. The explicit effects presented in the article, according to the author, are unequivocal evidence that the direct current of magnetic charges in the conductor generates precisely the vortex electric field.

5. Joint currents electric and magnetic charges in static superconductor and the ferrogravitational levitation.
In the previous dynamic experiments of the author (see [4]), joint currents of electric and magnetic charges were created using inertia forces in the closed superconducting plumbum wire unwound wound on a coil.

However, due to some circumstances, within the framework of the noted dynamic experiments, uncertainty remained with the sign of the interaction gravitational field of the electromagnetic current of solenoid with the natural gravity field of the experimental weights, i.e. the question remained unresolved, what was realized in the framework of experiments with rotating superconductors: the attraction of the experimental weight to the coil or repulsion? The resolution of this question is very important, since it sheds light on what vector character of the gravitational field is formed under conditions of the passage of joint linear currents of electric and magnetic charges through a superconductor, i.e. the paragravitational or ferrogravitational field?

The setup diagram for pairing constant electric and magnetic current in a static superconducting solenoid and refining the sign of the gravitational interaction is shown in Figure 9. In the experiments used cryostat shown in Fig. 6, as well as the magnetically charged assemblies and thermal couplings in its composition.

The technical differences of this experiment consisted in the fact that instead of arrows to indicate the effect of the passage of joint currents of electric and magnetic charges through the solenoid, a lead disk 1 with a thickness of 15 mm and a diameter of 50 mm which was installed under the bottom of the cryostat. The disc is mounted on an aluminum rod 2 which in turn was fixed to the movable part of the electromechanical scales 3. In addition, a direct electric current was supplied to the coil winding through clamps 4 which could vary in the range from 10 to 30 mA with a voltage of 1.5 v from a special source (SIP). It is important to note that the lead wire used in these experiments was covered with varnish insulation, and the winding of the coil was tight (not loose).
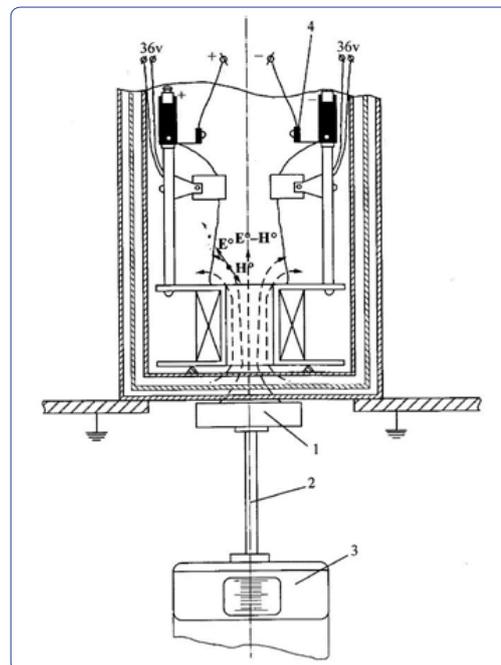

Figure 9: Installation diagram for pairing constant electric and magnetic currents in a static superconducting solenoid. The symbols **E°**, **H°** and **E° - H°** represent respectively the vortex vectors rotE, rotH and rot[**E - H**].

The technology of the experiments was as follows. After filling the cryostat with liquid helium and holding the cryostat – assembly system for 20 minutes, the power supply of the heaters of the thermal couplings was turned off, followed by switching on a direct electric current through the solenoid. Note that the latter

current was done with a certain delay of time 5 – 7 seconds, in the hope that we can agree on the time of passage of electric current with the time of passage of a current of magnetic charges. Next all attention was paid to the scale of scales. Note that in this case the necessary measures were taken to unambiguously determine the sign of the possible gravitational interaction.

Experiment Results. The data of three attempts that were carried out within the framework of this experiment are presented in Figure 10, where the numbers of the assemblies used (from 1 to 3) are plotted along the horizontal axis, and the values (magnitudes) of the change in the weight of the cargo ΔP are plotted along the vertical axis. In the upper part of Fig. 10 shows the parameters and polarity of the electric current used in each experiment. In addition to taking into account the parameters of the electric current, its polarity was taken into account. From Figure 10 it can be seen that a clear response of the scales was found only in one of the three experiments carried out - in assembly No. 1 and amounted to 55 mg with a possible error of ± 15 mg.
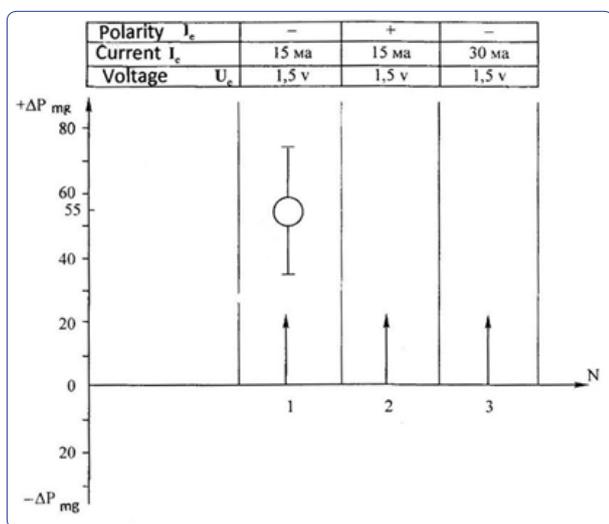

Figure 10: Experimental results of the effect of an artificial gravitational (ferrogravitational) field formed by means of joint constant currents of electric and magnetic charges in a superconducting solenoid on an experimental lead weight.

The parameters of the electric current, which was passed in this effective case through the solenoid, were: current strength 15 mA at a voltage of 1.5 V. The polarity of the electric current, in this case, was determined to be negative. The noted time of passage of the observed impulse of force was estimated by us as 3 - 4 seconds, and the nature of the reaction of the scales can be assessed as more or less smooth.

The discussion of the results. According to the results of experimental and theoretical studies of the author, the sources of the artificial and natural gravitational fields are not attracted, but repelled from each other. At the same time, according to the results of inertial experiments, the author erroneously ascribed a minus sign to such interactions, which implies attraction between the sources of the noted GFs. The result of this experiment testifies in favor of the fact that the sources of artificial GF, which, as a rule, is ferrogravitational, and natural GF which are mainly paragravitational fields do not attract but repel each other. It is the process of such repulsion that underlies such an important gravitational effect as the ferrogravitational levitation.

Of course, in the presented study, only one of the three assembly options worked for the effect. In the author's opinion, this is undoubted luck, since here is literally a "cosmos" of options. The parameters of the magnetic charges current and its true polarity are unknown. Therefore, there is no clarity regarding the parameters of the electric current, which is consistent with the possible current of magnetic charges. There are also other technical problems, for example, providing a reliable superconducting transition in the MC - solenoid contact. Therefore, the experiments described in this section were performed in a trial and error mode, and the presented effect, which, in the author's opinion, may be relevant, should be considered as a great success.

Note 5. The author notes with regret that due to a number of everyday circumstances, the article does not contain photos of the experimental equipment used (a small electromagnet with a milling "filling", two small cryostats and blocks with ferroelectric arrows). The fact is that these experiments were carried out, with long breaks, for more than 20 years. At the same time, the author worked in the status of an individual researcher, since for his addiction to real magnetic charges, he was fired from the Physics Department of the Academy. The marked experimental equipment, disassembled, was stored in a private garage and was ready for new experiences. However, in 2018, the local authorities, in a "cavalry attack" mode, cleaned out the space under the garages. The operation was carried out at such a speed that the author was unable to save anything. Fortunately, his car, at that moment, was in a different place.

Conclusion

The author's studies have shown that the physics of the confinement magnetic charges in the structures of substance which is fundamentally different from the confinement of electrons is the main reason for the emergence and dominance of flawed concept of electric magnetism of Maxwell.

Since the introduction this vicious electromagnetic concept (1873) which "buried alive" real magnetic poles (charges), numerous surrogate theories have been formed in the world of physical science. By examples of such theories are such as the curvature of 4-dimensional space-time explaining the nature of gravity, the global expansion of the Universe and the big bang, the annihilation of particles in particle - antiparticle pairs, fiction in the form of a "particle of God", i.e. of the Higgs boson, "endowing" particles with mass, and a variety of others.

Many generations of scientists, both physicists and representatives of other natural sciences, were brought up on these theoretical surrogates. Hence the negative attitude of the overwhelming majority of scientists to the possible existence real magnetic charges in the compositions of our (terrestrial) substance. An example of this is the history of the ignoring by the world physical community of detailed and reproducible experiments with magnetic charges by F. Ehrenhaft and his many followers.

To factors contributing to the noted negative in relation to real magnetic charges should also include the fascination of modern physics with high-energy projects. As shown in Chapter 1 of this article, with an increase in the internal energy of a body, the forces of confinement of magnetic charges and true anti-electrons in the structures of substance increase that very makes it difficult to detect and study these real particles.

Thus, the existing physical science, for almost 150 years, "thanks" to the vicious ignoring noted above, was formed without taking into account real magnetic poles (magnetic charges), which, paradoxically, make up half of all charged fundamental particles of Physical World. If we take into account that in addition to real magnetic charges, the theory also ignored such real fundamental particles as true antielectrons, then all existing theoretical physics is built using only one quarter of real charged particles, namely, electric spinors (particles with a negative electric charge) and above all of electrons. Therefore, the existing fundamental theoretical physics, with good reason, can be defined as the electronic physics.

The vicious electrical magnetism of Maxwell given its general-physical harmfulness, can to associate with the "cancerous formation" in the "body" of physical science, the "metastases" of which have hit its many areas and directions [25]. Conducting global "chemotherapy" of the modern physical theory with the purpose of eliminating the numerous misconceptions generated by Maxwell's vicious concept, according to the author, is the most urgent task for today.

References
1. Sizov RA (1971) Delocalization of the magnetic moment of Fe^{3+} ions in Y type hexagonal ferrite at 293^oK. Journal of Experimental and Theoretical Physics 60: 1363-1370.
2. Sizov RA (2001) New Presentation of Nature Magnetism, Gravitation and Nuclear Forces of Bonding. Akademizdat Center Science Moscow 62.
3. Robert A Sizov (2020) The Experiments Detecting of Real Magnetic Charges in Structures of Atoms and Substance. Journal of Modern Physics 11: 1245-1261.
4. Robert A Sizov (2020) Experimental Ferrogravitational Field around Untwisting Closed Superconductor. Journal of Modern Physics 11.
5. Robert A Sizov (2015) Real magnetic poles (magnetic charges) in the Physics of magnetism, gravitation and levitation. Journal of Modern Physics 6: 1013-1022.
6. Sizov RA (2008) Electric and Magnetic Spinor Particles as Structure-forming Components of Mass and Electromagnetic Source Gravitation. Akademizdat- Center Science Moscow 260.
7. Sizov RA (2016) Electromagnetic Shells of Atoms and the Periodic System of Elements. Journal of Modern Physics 7: 2374-2397.
8. Robert A. Sizov (2017) Magnetic and Electric Charges in Physics and Technology of Electromagnetic and Magnetoelectric Induction. Journal of Modern Physics 8: 964-981.
9. Maxwell JC (1873) Treatise on Electricity and Magnetism. Clarendon Press, Oxford.
10. Sizov RA (2019) The electrical magnetism of Maxwell (1873) is the "crooked mirror" of physical science. Applied Physics Research 11: 49-55.
11. Robert A. Sizov (2015) Dirac's "holes" are the true Antielectrons and real particles of Antimatter. Journal of Modern Physics 6: 2280-2289.
12. RA Sizov (2017) "Electrical" and "Magnetic" Worlds in Universe. Journal of Modern Physics 8: 1072-1086.
13. Ehrenhaft (1910) Wiener Berichte 119(11a) 836; (1942) Jour. Frank. Inst. Mar., 235; (1951) Acta Phys. Austriaca 5.
14. Mikhailov VF and Ruzicka J (1989) Magnetic charge in the experiments by F. Ehrenhaft and their modern development. Acta physica Univ Comen 24: 97-148.
15. Robert A. Sizov (2018) Nuclear Physics with Magnetic Charges. Journal of Modern Physics 9: 145-171.
16. Robert A. Sizov (2020) Great Mistake of Great J. C. Maxwell. Applied Science and Innovative Research 4.
17. Dirac PAM (1931) Quantized Singularities in the Electromagnetic Field. Proc Roy Soc A133: 60-72.
18. Robert A. Sizov (2018) Real Magnetic Charges as A Negation of the Electric Magnetism Maxwell and Electrified Dirac's Monopole. Phys Astron Int J 2: 17-20.
19. Robert A. Sizov (2016) The World Physical Triad: Matter, Antimatter and "Dark Energy" in the Processes of Climatic Changes on the Earth. Journal of Modern Physics 7: 558-572.
20. Robert A. Sizov (2015) Real Magnetic Charges in the Substance, Ferrogravitation and Technical Levitation. Journal of Modern Physics 6: 1591-1601.
21. Higgs PW (1964) Broken symmetries, massless particles and gauge fields. Phys Lett 12: 132-133.
22. Sizov RA (2012) Levitation as a Spread Force Manifestation of Natural Ferrogravitation. Akademizdat-Center "Science", Moscow 96.
23. Sizov RA (2013) Transference of people and loads in the terrestrial space by means of technical ferrogravitation. Akademizdat-Center "Science" Moscow 118.
24. Robert A. Sizov (2020) The Gravitational Levitation in Aerospace Technologies of Future. Applied Science and Innovative Research 4.
25. Sizov RA (2020) The Vicious Electric Magnetism of J. Maxwell and its "metastases" in Physics. OSP J Nuc Sci 2 JNS-2-111.