TO THE NON-ELECTROMAGNETIC THEORY OF LIGHT

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Annotation

It is shown that the thermodynamic form of the equations describing processes in current-carrying systems is more general than Maxwell's equations. The erroneousness of his concept of a single electromagnetic field has been revealed. On the basis of the thermodynamic derivation of the Maxwell equations proposed earlier in their field form, a critical analysis of the postulates laid down in the basis of its electromagnetic theory of light is given, and its internal and external inconsistency is revealed. Numerous experimental data are presented, which indicate the existence of non-electromagnetic radiation. The conclusion is made that the theory of Maxwell is essentially limited and that it is necessary to develop a more general concept of light based on the existence of non-baryonic matter with properties identical to the ether and free from the contradictions of the electromagnetic theory.

Key words: light, electromagnetic waves, radiant energy, Maxwell's equations, rethinking, non-electromagnetic effects

1. Introduction

In the history of science, erroneous interpretation of various experimental facts is often [1]. This happened, in our opinion, with the Maxwellian interpretation of Faraday's experiments, which he believed that "the results of many of his investigations aimed at revealing the connection between light and electricity ... turned out to be negative" [2]. In any case, subsequent generations of researchers discovered dozens of internal and external contradictions in the Maxwell's electromagnetic theory of light [3], as well as a variety of situations in which electromechanical and other phenomena could not be explained within the framework of this theory [4 ... 49]. However, the decisive argument, which cast doubt on the existence of the electromagnetic field (EMF), was astrophysical discoveries at the turn of the 20th and 21st centuries. They led to the discovery of the so-called non-baryonic matter, which consists of "dark matter" and "dark energy" and is not less than 95% of the entire universe mass [50,51]. This matter, unlike ordinary (baryonic, structured) matter, is invisible, since it does not participate in electromagnetic interactions and is manifested only due to its gravitational properties. Its existence is now confirmed in four independent ways and is considered a firm-established fact, which forces us to reconsider many of the established ideas.

First of all, this relates to the nature of light, since non-baryonic matter has neither electrical nor magnetic properties, and its fraction reaches 100% in the "dark" regions of the Universe (free of baryonic matter). Therefore, non-baryonic matter does not leave room for any other luminiferous media claiming for materiality (electromagnetic field, photon gas and physical vacuum). This circumstance makes the revision of Maxwell's electromagnetic theory of light [3] inevitable.

This article is an attempt to collect together the well-known arguments to date, indicating the need to replace the electromagnetic theory of light with a concept that is more adequate to the entire

sum of our knowledge of the nature of light and its various manifestations in animate and inanimate nature.

2. The postulate character of Maxwell's electromagnetic theory of light

It is known that many of Maxwell's contemporaries (including such titans as G. Gelmholtz, V. Thomson, G. Kirchhoff; L. Galvani, A. Volta, etc.) initially (before Hertz's experiments) did not recognize the existence of electromagnetic waves and his theory Light, which consisted of a system of 20 equations and was for them "a secret with seven seals") [1]. The situation changed only when O. Haviside [52] and H. Hertz [53] gave these equations a field form, relying on the apparatus of vector algebra developed by that time and reducing these equations to four:

$$\text{rot } \mathbf{H} = \mathbf{i}_e + \partial\mathbf{D}/\partial t, \quad (1)$$

$$\text{rot } \mathbf{E} = \partial\mathbf{B}/\partial t, \quad . \quad (2)$$

$$\text{div } \mathbf{D} = \rho_e, \quad (3)$$

$$\text{div}\mathbf{B} = 0. \quad (4)$$

Here, **E** and **H** are the electric and magnetic field strength vectors; **D**, **B** - vectors of electric and magnetic induction; Ie is the conductivity current density; ρ_e is the electric charge density.

Assumptions made in this case, it became possible to assess to the full only after they were given their thermodynamic conclusion in its application to current-carrying systems [54]. Indeed, if we assume, after Maxwell, that the processes of mutual transformation of the electric and magnetic fields are reversible, then the basic equation of the thermodynamics of complex systems in its application to dielectrics and magnets is valid for them [56]:

$$dU = TdS + pdV - \mathbf{E}\cdot d\mathbf{D} - \mathbf{H}\cdot d\mathbf{B}, \quad (5)$$

where *U, S, V* - internal energy, entropy and volume of the system; *T, p* are the absolute temperature and pressure of the system under consideration, and the terms on the right-hand side characterize the heat transfer *TdS*, the work of the volume deformation *pdV*, the electric polarization $\mathbf{E}\cdot d\mathbf{D}$, and the magnetization of the system $\mathbf{H}\cdot d\mathbf{B}$.

This equation can be given the character of the identity, which is also true for non-static (flowing with finite velocity) processes, if we consider the internal energy *U* as a function of the independent variables *S*, *V*, **D** and **B**. In this case, the parameters *T*, *p*, **E** and **H** acquire meaning partial derivatives of energy *U* with respect to these arguments, which will allow us to generalize nonequilibrium thermodynamics ("thermokinetics") to nonthermal processes and isolated systems [56]:

$$dU/dt = TdS/dt + pdV/dt - \mathbf{E}\cdot d\mathbf{D}/dt - \mathbf{H}\cdot d\mathbf{B}/dt = 0, \quad (6)$$

From (6), in the absence of volume deformation ($pdV/dt = 0$), heat transfer and losses in the conversion of electric energy to magnetic ($TdS/dt = 0$), it follows:

$$\mathbf{D}/d\mathbf{B} = -\mathbf{H}/\mathbf{E}. \quad (7)$$

A similar relation can be obtained from equations (1-4), if one takes into account that the conduction current density $\mathbf{i}_e$ in (1) is expressed by the product of the density of the electric charge ρ_e at the rate of its transfer $\boldsymbol{\upsilon}_e$. Then, considering it together with (3), we find:

$$\mathbf{i}_e = \rho_e \boldsymbol{\upsilon}_e = (\boldsymbol{\upsilon}_e \cdot \nabla)\mathbf{D}. \quad (8)$$

Consequently, the right-hand side of equation (1) has the meaning of the total time derivative of *t* from the electric induction vector **D** in the dielectric of unit volume:

$$(\boldsymbol{\upsilon}_e \cdot \nabla)\mathbf{D} + \partial\mathbf{D}/\partial t = d\mathbf{D}/dt \quad (9)$$

The same relation can also be written for the vector of magnetic induction **B** per unit volume of the magnet, considering jointly (2) and (4), i.e. taking into account the absence of a magnetic analog of the conduction current $(\boldsymbol{\upsilon}_m \cdot \nabla)\mathbf{B} = 0$):

$$\partial\mathbf{B}/\partial t = d\mathbf{B}/dt \quad (10)$$

Then equations (1) and (2) acquire a symmetric form:

$$\text{rot } \mathbf{H} = d\mathbf{D}/dt\ . \quad (11)$$

$$\text{rot } \mathbf{E} = -\, d\mathbf{B}/dt\ . \quad (12)$$

Dividing the right-hand and left-hand sides of equations (10) and (11) term by term, we obtain the relation:

$$d\mathbf{D}/d\mathbf{B} = -\ \text{rot } \mathbf{H}/\text{rot } \mathbf{E}. \quad (13)$$

Comparing (7) and (13), we find that Maxwell's equations reflect a very particular case of the energy conservation law (6), when the vectors **E** and **H** circulate through closed trajectories (ie, when the electric and magnetic fields are vortex), And the circular integrals of them do not vanish and can be represented by the field differential operators rot **H** and rot **E** [57]. However, in the static state, the electric field E is known to be potentially. Therefore, in order to avoid the inversion of *d***E** to zero, Maxwell introduces an additional concept of electromotive force (EMF) [3, §598]:

$$\mathcal{E} = \oint (-\nabla\varphi - \partial\boldsymbol{A}/\partial t + \boldsymbol{\upsilon}_e \times \boldsymbol{B})d\boldsymbol{l}\ , \quad (14)$$

where dl is the vector element of the length of the closed electrical circuit.

Thus, he introduces into the concept of electromotive force as the work of transferring a unit charge along a closed path (ie as a function of the process) the so-called "external forces" $\partial\boldsymbol{A}/\partial$t and $\boldsymbol{\upsilon}_e \times \mathbf{B}$, emanating from the magnetic field and Determined by the rate of change of the vector magnetic potential ***A*** and the Ampere force. Moreover, he artificially combines in one expression the EMF of the strength of electric and magnetic nature, which predetermines the further unity of these fields.

All this is done in order to predict the existence of electromagnetic waves. Meanwhile, expression (9) already represents the so-called "kinematic" equation of the damped induction wave **D** of the electric field, which propagates from the source in one direction. The validity of this statement is confirmed by the fact that expression (9) already represents the so-called "kinematic" equation of the damped induction wave **D** of the electric field, which propagates from the source in one direction. This becomes especially obvious if we ignore the decay *d***D**/*dt* and represent (9) in the form of the wave equation [58]:

$$(\partial\mathbf{D}/\partial\mathbf{r}) = \boldsymbol{\upsilon}_e^{-1}(\partial\mathbf{D}/\partial t) \quad (15)$$

An analogous equation can also be written for the vectors **B**, **E**, and **H**. Thus, the transition to vector field functions rot **H** and rot **E** only complicates the problem, limiting the range of applicability of the Maxwell equations to closed contours and vortex fields. This is all the more true since the second-order "dynamic" equation, which is a solution to Maxwell's equations and describes two waves of D'Alembert and Euler [58] moving in the opposite direction, does not give anything new to understand the nature of light. At the same time, such a transition required the introduction of a number of postulates:

1. It was assumed that the potential electric field can become vortex if the non-closed electrical circuit of the circuit type broken by the capacitor is closed by the hypothetical "displacement current" $\mathbf{i}_c \equiv \partial\mathbf{D}/\partial t$, which extends the conduction current ie between the capacitor plates or in the air (Vacuum) space between the ends of an unclosed electrical circuit (as in a Hertz vibrator).

2. The displacement currents create a vortex magnetic field **B** along with the conduction currents. It was silently assumed that to prove the vortex nature of the magnetic field, it is sufficient to close the isopotential lines of the field, illustrated by iron filings and taken as the direction of the magnetic "cohesion fluxes".

3. The magnetic field in both the ether (vacuum) and in the magnetic circuit is of a purely vortex nature and forms with the electric field a single material entity, called Maxwell's "electromagnetic field" (EMF), which is capable of "storing and transferring energy after it Left one body and yet did not reach the other "[3];

4. EMF oscillations propagate in space in the form of alternating traveling electric and magnetic waves, which can exist in a "separation" from their sources (stationary and moving charges).

5. The mechanism of energy transfer by an electromagnetic field consists in the interconversion of electric and magnetic energy and can be illustrated by alternating the force lines of the electric and magnetic fields in the form of a "Bragg chain".

6. The light flux is purely electromagnetic in nature and must be retained by screens that are not permeable to electromagnetic waves.

However, on closer examination, it turns out that none of these postulates correspond to the real state of affairs.

2.1. Are the currents of bias conduction currents?

It is known that the electric field E is potentially and the circular integral of the vector **E** is equal to zero. However, in order to construct an electromagnetic theory of light, Maxwell needed a vortex electric field, which could form a successive chain of electromagnetic transformations with a vortex magnetic field. Therefore, he postulated the existence of bias currents $\mathbf{i}_c = (\partial\mathbf{D}/\partial t)$, closing the conduction currents $\mathbf{i}_e$ outside the conductor and therefore able to close the electric circuit with a current of equal force. This current, as Feynman rightly observed [59], is not at all connected with the motion of something. In particular, it does not cause (in contrast to the conduction current) the release of heat. This postulate was not based on any previous experiments that revealed the flow in a vacuum

of currents equal in strength to the conduction currents. Moreover, even if this current were to exist, it would be directed towards the conduction current, since, as is well known, the total current in the circuit $\mathbf{i}_e + \mathbf{i}_c$ ceases after the charging of the capacitor [60]. In addition, as E. Parsell showed, the field between the plates of the capacitor is generated in reality by currents in conductors, which lead to a charge to the capacitor plates [61]. Thus, this postulate of Maxwell turns out to be on closer examination internally and not seemingly contradictory.

2.2. Are the electric and magnetic fields intact?

It is known that EMF is characterized by the strengths **E**, **H** and induction vectors $\mathbf{D} = \varepsilon_o\mathbf{E}$ and $\mathbf{B} = \mu_o\mathbf{H}$, where ε_o and μ_o are the permittivity constants of the vacuum (ether). Thus, the vectors **E** and **H** or **D** and **B** are, generally speaking, independent, which is the basis for distinguishing these fields in statics. In dynamics, along with the two communication equations mentioned above, one more appears, due to the phase-shifted changes in the **E** and **H** [2] vectors, which were discovered by M. Faraday: $\mathbf{E} = \mathbf{E}(\mathbf{H})$ or $\mathbf{H} = \mathbf{H}(\mathbf{E})$. In this case, only one of the four mentioned parameters remains independent, which indicates that there is no any transformation of energy in the light-bearing medium at all. This single parameter could fully characterize the intense state of the ether, and then all of Maxwell's arguments about the properties of electromagnetic waves would relate to him in full accordance with the model that served Maxwell as the "building forests" in his theory. Instead, the ether was replaced by a single electromagnetic field.

In the future, the illusion of the unity of these fields would seem to have been reinforced by the existence of a flux of electromagnetic energy in the form of a Poynting vector $\mathbf{P} = \mathbf{E}\times\mathbf{H}$. However, this ilusion disappears as soon as we turn to the description of the flux of electromagnetic energy not through the parameters of the state E and H, and through the parameters of the process - the flows of their material carriers $\mathbf{i}_c = (\partial\mathbf{D}/\partial t)$ and $\mathbf{i}_m = (\partial\mathbf{B}/\partial t)$. Then it turns out that in the process of interconversion of the energy of the electric and magnetic fields, the fluxes $\mathbf{i}_c$ and $\mathbf{i}_m$, due to the energy conservation law (5), are reversed [62]:

$$\mathbf{\Pi} = dE/dt = \mathbf{i}_c + \mathbf{i}_m = 0, \qquad (16)$$

since $\mathbf{i}_c = -\mathbf{i}_m$. Then it becomes clear why the Poynting's vector vanishes when the interaction of the current-carrying system with EMF proceeds reversibly (in the absence of thermal losses). The point is that there is no flow of electromagnetic energy as such, and not in the "slip" of this vector along the surface of the circuit with current [56]. The idea of the lines of force of the magnetic field as a "flow of cohesion" does not hold up, either. Motion of a certain "magnetic substance" along these lines. A clear indication of the erroneousness of this interpretation is the immobility of the suspension of iron sawdust in the oil when the current is passed through the conductor immersed in it. Thus, Maxwell's notion of the flow of electromagnetic energy as a similarity of the flow of an incompressible fluid is also not justified.

2.3. Can the force field exist in isolation from its sources?

It is known that the idea of a magnetic field and its lines of force in space as a physical reality appeared for the first time in the writings of Michael Faraday [2]. Maxwell supplemented his idea of a vortex electromagnetic field, thus introducing, along with the ether, one more material essence. This understanding of the field was in conflict with its definition given by mathematicians who believed that "the real field is a mathematical function that we use to avoid the idea of long-range action" [59], as well as the understanding of the field by physicists, Who, like A. Einstein, believed that "the field is by no means a kind of matter, but its property, for the field ... is a means of interaction of material systems" [64]. In this regard, the question is natural: can EMF serve as a carrier of radiant energy "after she left one body and has not yet reached the other?" To uniquely answer this question, it is sufficient to consider the expression of the EMF energy through the intensive variables **E** and **H**:

$$E^{\text{п}} = \varepsilon_o \mathbf{E}^2/2 + \mu_o \mathbf{H}^2/2. \qquad (17)$$

If we take into account that the vectors **E** and **H** vary in phase (that is, they simultaneously reach an antinode), then the EMF energy $E^{\text{п}}$ will also experience pulsations with the field frequency in violation of the energy conservation law [65]. Consequently, EMF can not not exchange energy with its sources (charges and currents), and in isolation from them can not exist. This circumstance excludes the existence of EMF, "torn from the sources."

2.4. In what form is radiant energy transferred?

The basis for the conclusion that light is an electromagnetic wave in ether was Maxwell's correlation of the square root $(\varepsilon_o\mu_o)^{0.5}$ of the product of the coefficient of dielectric and magnetic permeability of various substances with refractive indices of light *n* in them. However, such a correlation will also be observed when light is non-electromagnetic in nature, generating electromagnetic oscillations in the radiator and vice versa, when electromagnetic oscillations in it are converted into the energy of an ether that does not have electrical and magnetic properties and is transferred to them, rather than hypothetical EMF. In this case, the relative dielectric and magnetic permeabilities of the substance ε and μ will acquire a different meaning of the ratio of a single parameter that characterizes the intensity of the radiation field. Nevertheless, the calculations based on them on the speed of light in the ether will still correspond to their experimental values. Thus, the "proof" of the electromagnetic nature of light proposed by Maxwell was reduced to confirmation by calculations of what was postulated by him in advance. Here there is a "vicious logical circle," which Maxwell himself and his followers did not notice.

It may seem unbelievable, but the fact of the presence of magnetic properties has not yet been detected by light or any of its material carriers (ether, photon gas, physical vacuum and non-baryonic matter). This is all the more strange since Maxwell's equations assert the transformation of the energy of an electric field into a magnetic field and vice versa in equal quantities! Only recently, in the course of precision experiments, a group of Dutch physicists, led by the post-graduate student Matteo Burrezi from the Institute of Atomic and Molecular Physics in Amsterdam, succeeded in detecting insignificant traces of a magnetic field oscillating at frequencies characteristic of the optical range

[66]. To achieve this frequency range and the necessary sensitivity, the metal coating on the tip of the probe of the scanning microscope with a width of a width of only 40 nm protruded in their installation as a detector. The scientists placed the probe at 20 nm from the waveguide, where a laser beam with a wavelength of 1550 nm was propagated. As a result of a rather complicated measurement technique, the researchers concluded that they detected signs of a secondary magnetic standing wave in the detector in the vicinity of the waveguide. However, as in the experiments of Hertz, there was a possibility that this was not actually a field of light wave in the ether, but a magnetic field induced by it in the detector!

Thus, it did not follow from anywhere that the magnetic field was generated by currents in the air, as Maxwell believed.

3. The external inconsistency of the electromagnetic concept of light

It is known that the "decisive experiment", which ensured the recognition of Maxwell's theory of the electromagnetic field, was the experiments of H. Hertz (1888) with vibrators as antennae-emitter and receiver of radiation [67]. These experiments, discovered the fact of transferring the energy of electromagnetic oscillations from the radiator to the receiver through the space separating them. However, it did not follow from these experiments that the electromagnetic oscillations in the Hertz radiator should cause in the surrounding space, too, electrical and magnetic disturbances that change rapidly along the direction - the energy of the electromagnetic oscillations in the radiator could well turn into the energy of the oscillations of the ether and again Restore its shape in the receiver of oscillations. This is most directly indicated by the absence of ether electrical and magnetic properties, making it incapable of electromagnetic oscillations.

Understanding of this circumstance prompted N. Tesla in 1889 to reproduce the experiments of Hertz in closer to the optical frequency range on its transformer, called the "amplifying transmitter" [68]. As in Hertz's experiments, a constant-current source with a spark gap and a step-up transformer feeding the antenna-the radiator-was used in its device. However, due to a number of improvements in the arrester and transformer, it reached unbelievable even today's voltages of over 10 million volts. As a result, he discovered the existence of a new radiation, which he called "radiant electricity." This radiation was neutral with respect to electric charges and magnets and had a huge penetrating power. With a small pulse duration (a hundred or less microseconds), its waves caused the displacement of physical bodies and the explosion (evaporation) of thin conductors, as well as the tingling and pain sensation of an operator protected from EMV [68]. When the Tesla transformer was tuned to "resonance" by changing the gap in the spark gap, a stream of a gaseous, glowing white cloud appeared on the high-voltage coil (across its coils), sliding along the surface of the coil, not penetrating the conductors, and the coil tearing off the end of the coil De white flickering discharges. This white flame could be concentrated and directed. Being very similar to light, this radiation possessed a number of unusual properties. It caused the appearance of a charge in copper plates, as well as for strong currents, as well as shock waves. The white flame-like discharge did not succumb to photography. By changing the pulse duration, they could either heat the room or cool it. One of the strange features of radiant energy was the so-called "fractionation": if in a parallel circuit consisting of a chain of incandescent

lamps bridged by a thick copper bus, normal current moved along the path of least resistance (through the shun), then the radiant current, opposite , preferred the greatest resistance (lamp). Another peculiarity of the radiant current was that it was transmitted along a single wire, causing, in ordinary and burnt-out incandescent lamps, a glow similar to the brightness of an arc lamp. Wires connected to the output of the coil, when immersed in oil, formed not a surface of its depression up to 5 cm. Radiation penetrated through metal screens, opaque to EMV. It was the discovery of a completely new kind of energy and radiation. Convinced of his non-electromagnetic nature, N.Tesla visited H. Hertz in 1889 to convince him of the error of his interpretation of the results of his experiments as electromagnetic waves. On this occasion he wrote: "It would be a great mistake to consider that light is propagated in the form of electromagnetic waves" [20]. It is regrettable that neither Hertz nor subsequent generations of scientists took seriously these experiments. It was a long time before other scientific facts became available to the scientific community, confirming the existence of non-electromagnetic radiation.

In 1906 the Russian professor N.P. Myshkin reported on the completely inexplicable behavior of a thin mica disk suspended on a platinum thread in a vessel protected by a copper screen and additionally wrapped in opaque paper. The disc performed vibrational movements, reacting to the light of a candle, moving people and inanimate objects around it, and sometimes, in general, "for no apparent reason" [21].

In the 1931 the American engineer and inventor T. Jeronimus, in his famous experiment with plants in a dark cellar, demonstrated the ability of radiations to propagate through wires or dielectrics connecting the outer (illuminated) and internal plate (plant stand). At the same time, he clearly expressed the idea that not electrical energy is transferred by wires, although it has common properties with electricity and light. He called this energy "eloptic." Jeronimus conducted many experiments to detect the properties of such "waveguides", revealing a strict dependence of their conductivity on the magnetic field, the lunar cycle, the ratio of the dimensions of the plates, independence from the "square law of distances", and so on [22].

In the 1944 the Russian astrophysicist N. Kozyrev discovered the possibility of photographing stars with a closed camera of the telescope, thus revealing the existence in the universe of a specific type of penetrating radiation. In this case, the position of the star was ahead of the visible, which indicated a superluminal propagation velocity of this radiation [23]. Later these results were confirmed by a group of researchers from the USSR Academy of Sciences [24]. In the next it was found out that the presence in the cosmic space of non-electromagnetic radiation can be established by conventional telescopes [25].

In the 1950…60s, the Belarusian thermophysicist A.I. Veinik during numerous experiments with highly sensitive torsion scales confirmed the existence of radiation coming from objects of animate and inanimate nature that freely passed through massive steel or copper barriers, walls of buildings, etc., reflected from the surfaces Section of a number of media and twisted the thread of the balance either clockwise or against the hour hand [26].

In the 1973 an acousto-magnetoelectric effect was discovered in Russia, which proved the existence of the interaction of electrons with an ultrasonic wave [27]. This was in principle

contradictory to Maxwell's theory, which excludes the interaction of longitudinal and transverse vibrations. In subsequent years, a number of other features of laser radiation were discovered. In addition to the abnormally high penetrating power of laser beams, it was found that a circularly polarized laser beam experiences demolition from the plane of incidence, the direction of which depends on the sign of helicity (right or left rotation) [28]. Another feature of laser radiation was established by A.K. Tamm and V. Happer, who observed the repulsion and attraction of circularly directed laser beams [29].

In the 1980s, anomalous activity of superweak radiation of non-electromagnetic nature on living organisms was detected [30]

In the 1990s, anomalous radiation of the so-called "torsion" generators of A. Akimov was discovered, the radiation of which differs by deep penetration into the metal melt [31, 32].

At the turn of the 20th and 21st centuries a new series of discoveries followed. In 1999, the presence of radiation of a non-electromagnetic nature, similar in its properties to extrasensory-bioenergetic action, was detected in the radiation of an optical quantum generator of low power [33]. In these experiments, the laser beam, previously passed through a silicon plate, was directed to a vessel with maximally purified water, which at the same time changed its electrical conductivity. The presence of such a non-electromagnetic component of laser radiation was also confirmed later [34].

In 2000, during the experiments on the electrical explosion of foils made from highly pure materials in water, strange radiation from non-electromagnetic nature accompanied by the transformation of chemical elements was recorded. The excess heat was also observed [35, 36].

In 2001, in the experiments on the deceleration of an electron beam with an energy of 30 MeV from a tungsten target, a pendulum placed behind the target was fixed. The force causing the deviation of the pendulum had an upper limit of 10^{-6} N. The most characteristic was the change in the direction of swing of the pendulum when the bremsstrahlung was shifted from one end of the pendulum to the other [37]. Then, the effect of rotating electrically neutral objects on the semiconductor gamma-ray detector [38] was discovered, and more recently the non-electromagnetic effect of such objects on the radioactive decay process [39].

To date, quite a lot of additional evidence has been accumulated for the non-electromagnetic nature of long-range interactions, which have traditionally been related to electromagnetic ones. These include, in particular, the so-called "longitudinal electromagnetic waves" (IEMV) [40]. Experiments revealed a number of unusual properties of such waves: their ability to pass through the thickness of water, rocks, metal and reinforced concrete, spread along thin pipes bent at any angle or wound into a spiral, along slits and thin layers of water, along media boundaries, Containing free charges, and the like. To date, the generators of IEMV have been created, converters of electromagnetic waves from waveguide or coaxial to longitudinal form, IEMV mixers, meters for their power, detectors for IEMV, etc., and literary sources dealing with various aspects of the impact of IEMV have already thousands of publications. It turned out to be possible to split the flows of IEMV into parts and collect them in appropriate devices. At the same time, the losses at resonance frequencies in the IEMV are orders of magnitude smaller than for conventional transverse EMWs. This behavior of IEMV contrasts sharply with the rectilinear nature of light waves or photon fluxes.

With IEMV connect the appearance of forces acting along the conductor with current. The appearance of forces acting along a conductor with a current is associated with the IEMV. The existence of such forces was found in the experiments of A. Solunin and S. Grano during the motion of a copper conductor along the direction of the current in it [6]. The presence of such forces was confirmed in the experiments of G. Nikolayev [6], who proposed not less than a dozen "self-moving" devices operating on this principle, and after ten years - and in the experiments of A.K. Tomilina [17].

It should be noted that PEMV is much closer in its properties to long-range effects of non-electromagnetic nature, which has an anomalous effect on the health and psyche of people [41]. Not knowing their physical nature, the researchers gave them a variety of names. These include the "N-radiation" of M. Blondlo [42] and the "Z-rays" of A. Chizhevsky [43], the "bio field" of A. Gurvich [44], the "biocosmic radiation" of T. Ieronius [22] , "Reagan's Orgon Radiations" [45], "Morgan's X Agent" [46], "Radiostatic Radiation" by J. Peugeot [47], "Chain Fields and Radiations" by A. Veinik [26], "Psi-fields and radiation" by A. Dubrov and V. Pushkin [41], "torsion radiation" by De Sabbatts [48], "empty waves" by F. Seller [49].

This list of emissions of an unknown nature complements the "single field" of Maharishi-Hegelin, "informational fields" of R.Utiyama, "microleptonic fields" of AF. Okhatrin, the "morphogenetic field" of V.Shaldrejk, the "tachyon fields" by L. Fainberg, the "gravitational waves" of H. Nipper, and the like. [69]. Many researchers of such radiations emphasized the features of these radiations that are not characteristic of electromag- netic waves: their ability to be screened by polymer films that are transparent to electromagnetic waves, their specific polarization (levorotatory and rotational), anomalously high penetrating power and biological activity with extremely insignificant intensity, And long-lasting aftereffect, the targeting (selectivity) of the action, the ability to be transmitted along nerve fibers of any form S etc. [70]. The sources of these emissions can be objects of both living and non-living nature, stationary and non-stationary, active and passive (up to using the shape effect). All this indicates the existence of a wide range of non-electromagnetic radiation.

4. Conclusion

Natural scientists still care about the way in which the kind of energy exchange that ensures the integrity of a single object of living nature, be it a cell, organ or tissue, an individual, an individual or a population, is realized. The opinion of researchers on this subject is still diametrically opposed. Some believe that this exchange is carried out by material particles - carriers of interaction. For others, this is not-less tangible, for example, electrical, magnetic, gravitational, torsion, biophysical, and so on. field. For the third - something that we will never know. The electromagnetic theory of light can not answer this question because of its limitedness by one form of energy. Maxwell's equations do not contain any information about the force interaction of the electromagnetic field with the radiating bodies, leaving behind this theory even the electromechanics. Moreover, they also limit the physics of electromagnetic phenomena, since they exclude vortex processes from consideration. Maxwell's erroneous view of the electromagnetic field as something "relic", detached from the sources, leads to a violation of the law of conservation of its energy. The justification of this position by Hertz's experiments, based on the postulate on the continuation of the electromagnetic oscillations of the

radiator in ether, also turns out to be erroneous. Subsequent experiments did not confirm the presence of light in the corresponding properties. Many phenomena of non-electromagnetic nature, discovered after its recognition, indicate that light has a much more general nature, caused by the vibrations of any structural elements of baryonic matter, and not just electrons. Therefore, the discoveries of N. Tesla, which confirmed the etheric nature of light, served as an impetus to the development of radiophysics and radio engineering no less than the theory of Maxwell. The postulate nature of the latter led to the materialization of the electromagnetic field, predetermining the subsequent development of physics in an erroneous direction. Meanwhile, the radiation of objects of inanimate nature that are in a stationary state convincingly proves the existence of an uninterrupted energy exchange with the environment. The need to study this energy exchange raises the question of the general laws of not only optical and electromagnetic phenomena, but also about the unity of any other processes of energy interconversion.

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