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Dark Matter, Paradoxes of Electrodynamics and the Fifth Interaction

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Abstract: *Although the concepts of "dark matter and dark energy" are firmly established in cosmology, physicists do not see any reason to correct on this basis the fundamental theory of electrodynamics and give a new assessment the efficiency of such high-tech vacuum installations, as the tokamaks, the particle accelerators and colliders. In my article, I propose to remove this omission. The modernization of equations of electrodynamics is based on postulating an additional scalar magnetic field in to the presence of dark matter that explains the existence of the fifth interaction. A scalar magnetic field generates a longitudinal force different from the transverse Lorentz forces (the fifth force) and affects the state of the plasma in all vacuum installations.*

Keywords: *Tokamak (toroidal chamber with magnetic coils for plasma confinement); a toroidal (non-force) magnetic field; poloidal (force) magnetic field; vector potential* ***A****; dark matter; electron; positron; proton; mass; energy; resonance.*

1. Introduction

In the early 20th century after the experiments of Nikola Tesla it became clear that Maxwell's electrodynamics requires revision and improvement. But it took more than 100 years, and this task is not finished and today. Attempts by a number of scientists [1,2,3] to point out the obvious contradictions and paradoxes of the classical and quantum electrodynamics encounter complete lack of understanding and fierce opposition from the apologists of the ruling today in the physics of Einstein's theory . As a result the Maxwell equations have been separated from the original model of the environment in which the conduction currents and displacement played a very definite physical role. Since then, the electrodynamics of Maxwell lost virtually every opportunity ist additions, changes and improvements. In the light of the latest discoveries in the cosmology of dark energy and dark matter as a intergalactic and galactic medium, it became necessary to revise the theory of classical and quantum electrodynamics and eliminate the paradoxes and contradictions that have accumulated in it. Dark matter is surprising close in its properties to the Maxwell's medium, in which arose vortex electric fields and displacement currents needed to derive the famous equations of electrodynamics [4,5]. Dark matter, which forms the basis of the galactic medium, is in constant force interaction with the baryonic substance of planets and stars that is born from it. This non-baryonic matter is the main source of energy for the formation in them not only of electron-positron pairs, but also of any other structural elements of matter. Moreover, possessing an all-pervasive character, dark matter influences all processes occurring in accelerators, colliders, Cherenkov generators and other vacuum installations on Earth and in the Cosmos and participates in all interactions. Four fundamental interactions are known: weak, strong, electromagnetic and gravitational. The physicist Yu. A. Baurov discovered the fifth interaction and connected it with dark matter [6,7].

2. New Electro Dynamics

2.1. List of Contradictions and Paradoxes in the Modern Theory of Electrodynamics

1) Of paradoxical role of the bias currents in the induction of the magnetic field of the moving charge. In the modern electrodynamics is dominated by the belief that the magnetic field is generated only by the transfer currents **j**t(r) # 0:

$$\mathrm{rot}\mathbf{H} = 4\pi /c\, \mathbf{j}t, \qquad \mathrm{div}\mathbf{H} = 0 \tag{1}$$

What is “bias currents”? Maxwell called component **j**b=1/4π (d**E** /dt) in their equations “bias current”, meaning that the electric field is created in the medium (dark matter) due to the relative motion of its constituent oppositely charged particles that form the dipole polarization. On the one hand the bias currents are a physical reality, because without them it is impossible to understand the workings of a simple capacitor, on the other the displacement currents are of mathematical formality, with which it is possible to make the symmetrical Maxwell’s equations. On one side of the magnetic properties of bias currents are taken to be of equivalent magnetic “transfer currents ” properties, on the other hand only the transfer currents generated moving magnetic fields are determined for some reason, as if the bias currents are absent.

2) Erroneous application of Gauss's theorem not only for of resting charge, but also for moving charge. As a result the dynamic state of the moving electric charges simply replaced by their static state. However, experimentally established parallel interaction of moving charges e1 and e2 with v1 = v2 = v and v (r) = 0, and the force of interaction between the charges in their motion changes. Coulomb's law (Gauss theorem - one of Maxwell's equations) is valid only for fixed charges. As part of the well-known concepts in electrodynamics, the magnetic interaction between the two charges at their rectilinear motion excluded from consideration, although experimentally obtained an interesting relationship to the magnetic fields of interacting charges moving in a straight line. Experiments confirmed the existence of longitudinal forces between charges moving in a straight line [1,3];

3) It is ironic, but the differential equations of Maxwell are not able to correctly describe the phenomenon of electromagnetic induction in a conventional transformer, because the vortex field **E** (r) induction in the space around the transformer is induced regardless of the presence in the this space of magnetic fields variable in time **H** (r), that is, when provided d**H** / dt = 0. In other words, for any point r of space around the transformer for differential Maxwell's equations, the induction eddy electric field **E** must be absent. However, the reality of the existence of magnetic fields in electrically sensitive environments (ε0, μ0) for any point in space near of the coil primary circuit magnetization is easy of install by placing this space winding magnetizing the second closed circuit. As a result of the magnetic interaction with the primary field in the secondary circuit generates energy, which can be registered. This effect can be used to create a generator with an efficiency of> 100%, working against all the laws of both classical Maxwell electrodynamics and quantum electrodynamics. Of generates "gratuitous" energy in the generator can be explained by disturbances in the environment between the ferromagnetic cores with windings separated by a relatively small gap of a dielectric material (2-3 mm.). Ferrite cores are placed in the field to strengthen the electromagnetic characteristics of the medium (ε, μ).

Replacing the ferrite cores with steel cores can enhance the effect in the secondary circuit in the dozens of times, as in the ferrite cores electromagnetic induction reaches a maximum of 0.4 - 0.5 Tl, and in the electrical steel magnetic flux density is 1.5 -2 Tl and more.

4) The formalism of the field vector potential **Ā** is well-used to describe the phenomenon of electromagnetic induction current in the conductor of the transformer outside, because outside of the transformer, provided d**H** / dt = 0 is realized d**A** / dt ≠ 0 condition. Researcher of the Tomsk Polytechnic University G.V. Nikolaev, using the single-valued magnitude of physical property of vector potential **Ā** and moving charge e, at (v « c) got [3]

$$\bar{\mathbf{A}} = ev/cr, \quad (2)$$

Ascertained existence of two types of magnetic fields in the space around moving charge:

$$\text{vector field } \mathbf{H}t = \mathbf{H}^{\perp} = \mathrm{rot}\bar{\mathbf{A}} \quad (3)$$

$$\text{scalar field } \mathbf{H}p = \mathbf{H}\| = -\,\mathrm{div}\bar{\mathbf{A}} \quad (4)$$

5) Paradoxically, in classical electrodynamics particle can move with a constant acceleration, generating energy from nowhere. It is known that in the case of charged particle movement in plane condenser with the constant tension to be applied classical uniformly accelerated motion $x = \alpha t^2$ appears. If during acceleration of a charge one takes into account force acting on a charge itself, then the braking due to radiation arises. In different works this effect is called in different way: Lorenz frictional force or Plank’s radiant friction. That force is proportional to third derivative of coordinate x relative to time and was experimentally proved many years ago. If we write the equations of motion

for the charge moving in space free from external fields impact and if the only force acting on the charge is the "Plank's radiant friction", then we would obtain following equation:

$$m\frac{d^2x}{dt^2} = \frac{2e^2}{3c^3}\frac{d^3x}{dt^3} \tag{5}$$

It is evident that equation in addition to trivial particular solution v=dx/dt=Const has general solution where particle acceleration is equal:

$$\alpha = \frac{d^2x}{dt^2} = C\exp\left[\frac{3mc^3t}{2e^2}\right] \tag{6}$$

i.e. is not only unequal to zero, but more over it unrestrictedly exponentially increases in time for no reason whatever!!! L.Landau and E.Lifshits in their classical work "Theory of the field" wrote apropos of this: "A question may arise how electrodynamics satisfying energy conservation law is able to give rise to such an absurd result in accordance to which a particle was able to unrestrictedly increase its energy. The background of that trouble is, actually, in infinite electromagnetic "eigen mass" of elementary particles."

In the Unitary Quantum Theory professor L.Sapogin proposed the same solution for the equation with the oscillating charge [8]. Let show that Schroedinger equation has physically similar solution also. Viz., let potential in Schroedinger equation be equal U(x) = rx. Then complete Schroedinger equation is as follows:

$$\frac{\hbar^2}{2m}\frac{d^2\Psi(x,t)}{dx^2} - rx\Psi(x,t) + i\hbar\frac{d\Psi(x,t)}{dt} = 0 \tag{7}$$

We will seek the solution in rather unusual form

$$\Psi(x,t) = b\exp\left(i\frac{m\alpha^2t^3}{2\hbar} - i\frac{m\alpha tx}{\hbar}\right) \tag{8}$$

Bu substituting (13) in (12) we get (after reducing):

$$-2m\alpha^2t^2 + (m\alpha - r)x = 0 \tag{9}$$

This relation will be fulfilled if

$$x = \frac{2m\alpha^2}{m\alpha - r}t^2 \tag{10}$$

If in (10) impose the requirement r →0 (potential vanishes), then absolutely strange particular solution appears where the particle is able to move with constant acceleration and to generate energy no of an unknowns where origin. That effect remains valid even if we put r→0 directly in equation (7);

6) Maxwell himself pointed out the difficulties with his equations to non-closed electric currents and the individual elements of the current. These difficulties lie in the fact that for the open currents alone, non-zero spatial derivative rot$\bar{\mathbf{A}}$ = $\mathbf{H}$ of vector potential $\bar{\mathbf{A}}$ cannot determine it completely. It revealed the existence of yet another non-zero spatial derivative div$\bar{\mathbf{A}} \neq 0$ of the vector potential $\bar{\mathbf{A}}$. In general, the vector potential $\bar{\mathbf{A}}$ can be represented as the sum of the potential and vortex components of $\bar{\mathbf{A}}$t + $\bar{\mathbf{A}}$p. This current element creates: the vector magnetic field

$$\mathbf{H}t = \text{rot}\,\bar{\mathbf{A}}t\,, \tag{11}$$

and the scalar magnetic field

$$\mathbf{H}p = -\text{div}\,\bar{\mathbf{A}}p\,. \tag{12}$$

It turns out that an infinitely long current conductor generates only a magnetic field **H**t, but the current conductor of limited length creates a the vector magnetic field **H**t and the scalar magnetic field **H**p. Since isolated current element is hard to imagine, since this requires the source and drain of charges, the field configuration is of interest in case of a real closed currents, in particular for this purpose may be a used the toroid, or used of the tokamak rings and collider.

7) Analyzing the causes of conflict in the modern electrodynamics can note a recognized violation of the third law of Newtonian's mechanics allowed by both quantum and classical electrodynamics. This is reflected in the recognition of some of the transverse Lorentz force, with complete disregard for the existence equal to them in size and identical nature of the longitudinal magnetic forces of reaction. From the fact of gross violation of the third law of mechanics in the magnetic interaction of

perpendicular elements AC, it follows that, by reason of the principle of superposition, the same gross violation law of Newtonian's mechanics for should be expected and in of the magnetic interaction of perpendicular elements, but of macroscopic current segments that make up the real circuit tokamaks and accelerators .

2.2. Correction of Maxwell's Equations of Electrodynamics

Correction of Maxwell's equations electrodynamics based on the recognition of the additional scalar magnetic field, acting along the direction of the current, which creates a force in addition to the transverse Lorentz forces. The expression for the electromagnetic energy flux density (Poynting vector) has the form

$$\mathbf{S} = (\mathbf{E} \times \mathbf{H}\mathrm{r}) + (\mathbf{E} \times \mathbf{H}\mathrm{p}) \tag{13}$$

Changing the scalar magnetic field equivalent to the formation of electrical charges, which change in turn generates an electric potential field. The longitudinal wave propagates along the axis toroyda in the tokamak plasma column. Based on experimental results, it is proposed to abandon the Lorentz calibration, but instead take the expression for the electromagnetic energy density in the form [9]:

$$\mathbf{S} = - \operatorname{div} \bar{\mathbf{A}} - \lambda\varepsilon 0\mu 0\, d\varphi/dt \tag{14}$$

Obviously, potentials imposed thus allow great flexibility in the use of Maxwell's equations. In the classical case relies $\mathbf{S} = 0$. When using the calibration (14) at $\lambda = 0$ we obtain the Coulomb gauge, and at $\lambda = 1$ we have the Lorentz gauge. If you do not assume the vanishing of the expression for $\mathbf{S}$, then at $\lambda = 0$ the scalar field acquires the meaning of a longitudinal magnetic field. Further transformations are performed in the standard way, with the result that allows to obtain the following system of equations:

$$\begin{aligned} & d\mathbf{E}/dt - \mathrm{rot}\mathbf{H} - \mathrm{grad}\, \mathbf{S} = 0, \\ & d\mathbf{H}/dt + \mathrm{rot}\mathbf{E} = 0, \\ & \operatorname{div} \mathbf{E} - d\mathbf{S}/dt = 0, \\ & \operatorname{div} \mathbf{H} = 0 \end{aligned} \tag{15}$$

For ease of reference the equations (15) Consider the case of absence of currents and charges and accepted $\varepsilon 0 = \mu 0 = 1$.

For clear separation of the concept of a longitudinal wave in a vacuum, and of the electromagnetic longitudinal waves that exist in material media, in [2] proposed to call the longitudinal electromagnetic E-wave of a wave, in which the magnetic field is zero, and the vector of the electric field is directed along the propagation direction energy flux density. This is a scalar function $SE_{//} = \alpha E$, where $\alpha = \alpha (x, y, z, t)$. Similarly, is determined by the longitudinal H-wave, generating energy flow $SH_{//} = bH$.

Differential equations for the generalized electromagnetic field can be derived from the concept of the Poynting's vector. Poynting's vector for electromagnetic waves of general view, including both conventional transverse modes and longitudinally polarized modes, can be represented as:

$$S = E \times H + \alpha E + bH \tag{16}$$

The corresponding energy density of this vector is expressed as:

$$W = 1/2\,(E^2 + H^2) + WE_{//} + WH_{//} \tag{17}$$

Where $WE_{//}$ and $WH_{//}$ - extra energy.

A rigorous derivation of the additional energy and differential equations for generalized electromagnetic field are given in [2].

Professor V.Aksenov in article [10] offers another modification of Maxwell's equations with non-power electromagnetic fields for the toroidal electrical currents, without taking in to displacement currents. The modified equation Aksenov shed light on the skin effect problem in of the non-power magnetic fields [10].

2.3. Experiments

2.3.1. Experiment of the Aharonov-Bohm

It is generally accepted that if the magnetic field **H** is known, there is no need to refer to "formal" vector potential $\bar{\mathbf{A}}$. However, the mere fact that the Schrödinger in wave equation appears only vector potential was obvious since the inception of this equation. Unsuccessful attempts to replace the vector potential $\bar{\mathbf{A}}$ in the equations of quantum mechanics "physical" magnetic field **H** is said that the wave function of any moving charge in the field of the vector potential $\bar{\mathbf{A}}$, should reflect the existence of a quite tangible interaction between a moving charge with this field. This interaction can be characterized by the magnitude of potential $\bar{\mathbf{A}}$ change and the wave function. In1956. in quantum physics has been demonstrated simple experiment, the result of which is known as the Aharonov – Boma's experiment [11]. When an electron moves along the long solenoid with a current, the electron trajectory is changing, although the magnetic field outside the solenoid is zero (**B** = 0). Aharonov-Bohm's effect has several explanations [3,10,11]. R.Feynman explains the effect of the interaction of the particles with the vector potential $\bar{\mathbf{A}}$ [11], while G. Nikolaev and V.Aksenov suggest that the particle interacts with the scalar magnetic field. In of the G. Nikolaev's electrodynamics the particle interacts with a new longitudinal scalar magnetic field $\mathbf{H}\|$ [3], in of the V.Aksenov's theory of the toroidal magnetic fields the particle interacts with the non-force toroidal magnetic field **H**t [10]. In theory, Nikolaev's scalar magnetic field of the generated by currents of displacement, in Aksenov's theory non-force magnetic field is generated by the displacement currents occurring between the plates of the capacitor and conduction currents. The experimentally observed phenomenon of the new longitudinal force in interact of moving electrons with the field of the vector potential $\bar{A}$ in the experiments of the Aharonov-Bohm's effect, was confirmed in later experiments by Japanese scientists (1984) [12]. During experiments, it was found change in the phase of the wave function of a moving charge in the absence and presence in the test area of the vector potential field $\bar{\mathbf{A}}$, in the complete absence in this area of the magnetic field **H**. The positive results of experiments matched only unique value of the vector potential $\bar{\mathbf{A}}$, is compared with the same parameters unambiguous longitudinal force. Changing the phase of the wave function of the vector potential $\bar{\mathbf{A}}$ is given by:

$$\Delta\varphi = q / \hbar \int \bar{\mathbf{A}} ds, \tag{18}$$

Where the integral is taken along the particle's trajectory. Experimental discovery of the phenomenon of longitudinal force effect of interaction along the axis of toroid of electrons with the field of vector potential $\bar{\mathbf{A}}$ in the of Aharonov-Bohm's experiments make one revise the well-established view about the transverse magnetic Lorentz forces alone and accept the presence of longitudinal forces of magnetic interaction.

2.3.2. Cathode-ray Tube with a Toroidal Winding (A. Kostin's Experiments)

Figure 1 demonstrates the phenomenon the moving charge interaction with the field of vector potential $\bar{\mathbf{A}}$**.** At the cathode-ray tube (1), at the location of the deflecting plates (2), a toroidal winding is placed (3). Toroidal winding is made of outer and inner layers of wound copper wire of 0.62 mm with a total of 500 turns. The need for double-layer winding is caused by eliminating the magnetic fields of the ring current (one winding is left-screw, the other is right). The windings are connected so that their magnetic fluxes summed. The electrons are accelerated in the tube potential difference 400V. On the vertical plate was fed a constant deflection voltage to set the basic displacement of the electron beam on the screen (5-20 mm). The current in the coil was varied 0-5A. The results of the experiment are shown in the graph (Figure 1). As the current increases in one direction of the electron beam deflection angle increases in magnitude relative to the reference deviation. Increasing the angle of deflection of the electron beam at a constant voltage across the deflection plates is due to a decrease in the electron beam velocity due to their interaction with the field of the vector potential $\bar{\mathbf{A}}$ of the toroidal winding. When the current in the winding changes to reverse current, the electron beam deflection angle decreases its value in relation to its baseline deviation, registering the effect of increasing the speed of the electron beam in their interaction with the field of the vector potential $\bar{\mathbf{A}}$ toroidal winding.

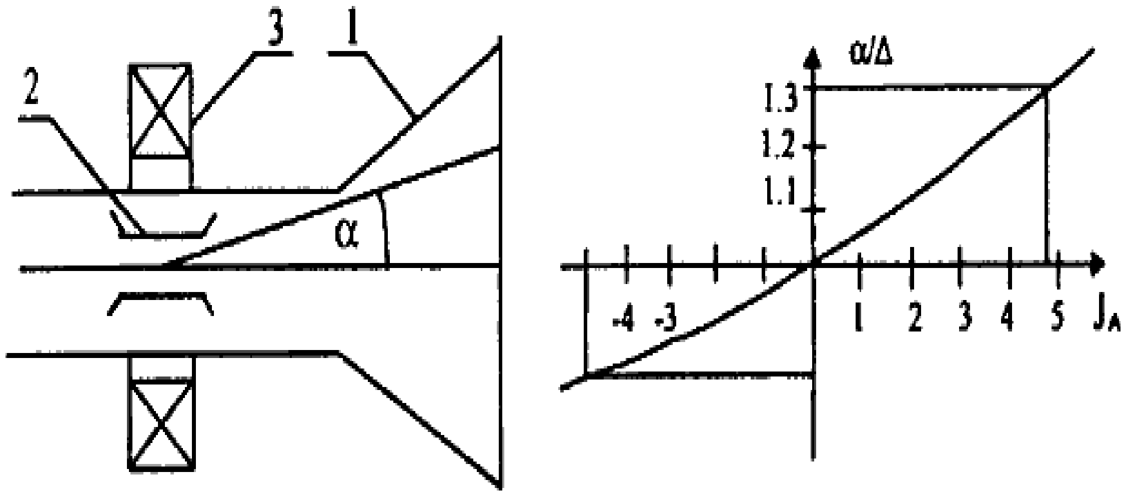


Figure1. *Cathode-ray tube with a toroidal winding*

Thus, the results clearly prove the existence of a conventional classical analogue of the well-known experience of the Aharonov-Bohm and confirm the existence of a previously unknown phenomenon in the science of the longitudinal magnetic interaction (fifth interaction) [3]. Not paying attention to the new scalar magnetic field $H\|$ = - divĀ and related new longitudinal magnetic interactions ((fifth interaction) science cannot provide a sufficiently of reliable theory electrodynamics tokamak, charged particle accelerators and collider. The phenomenon of longitudinal magnetic interaction present in the accelerator in the form effect of longitudinal instability of accelerated charged particles, it is experimentally proven fact. An example of this can serve as a spurious "edge effects" longitudinal induction currents in the conductive medium in the MHD- generator.

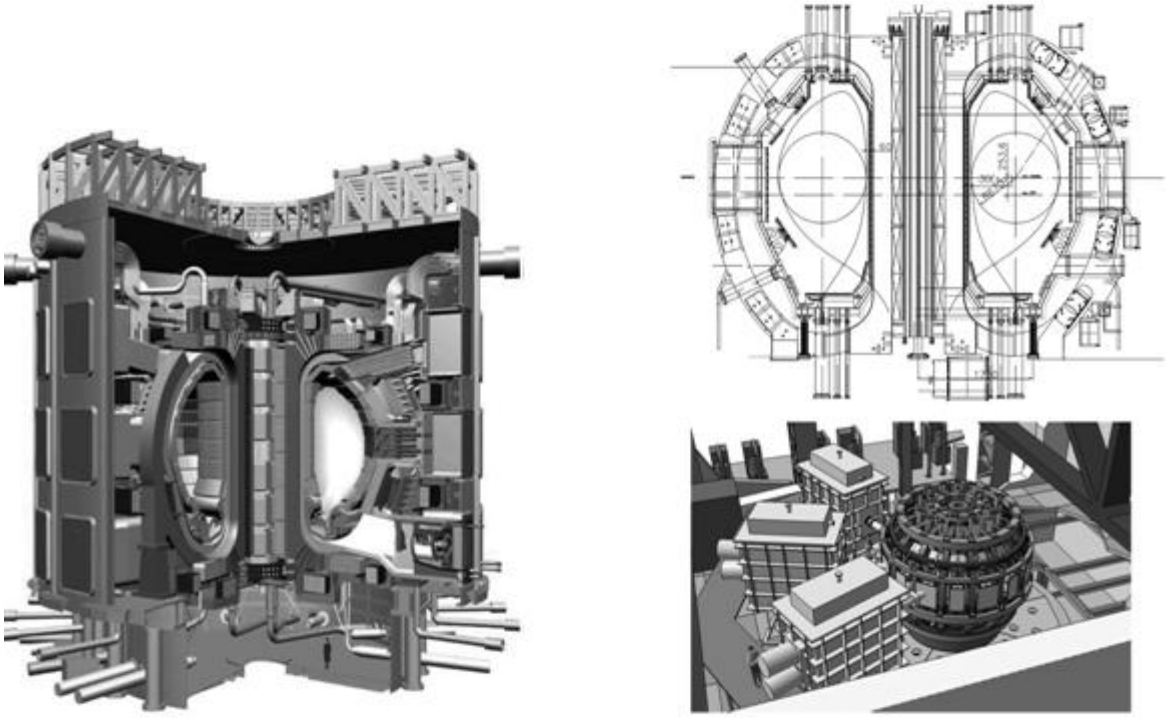
3. International Thermonuclear Experimental Reactor

3.1. Brief history of Tokamak

In June 2016 marks 10 years (2006) with of the beginning of the project between Russia, EU, USA, Japan, China, Korea and India for the joint construction of the International Thermonuclear Experimental Reactor (ITER) in France based on the tokamak. Great attention is given to the prospects for the tokamak as a of thermonuclear source (14 MeV) of the neutrons in the pulsed mode of operation. In June 2016 it was reported to delay completion of the work from 2020 to 2025. Today, we can talk about a complex problem faced by the creators of the ITER project, because for the calculation of electrodynamics in a tokamak currently used classical equations of Maxwell. Real electrodynamics inside the tokamak is very different from the calculation [1]. Hot plasma particles move along magnetic field lines of arbitrary topology to the walls of the tokamak and destroy it. Here is a brief history of tokamak. In June 1950, the soldier Oleg Lavrentyev sent a letter to the USSR Academy of Sciences, in which it was proposed to create a system with electrostatic confinement of hot plasma for controlled thermonuclear fusion (CTF). CTF is a synthesis of heavier atomic nuclei with the participation of lighter atomic nuclei with the release of large amounts of energy. At a temperature of 100 million degrees initial nucleons can overcome the electrical repulsion force is form heavier nuclei of helium atoms. Natural fusion reactor are the sun, where billions of years are already underway of the processes of nuclear fusion of helium nuclei using of the hydrogen deuterium. In terrestrial conditions, an inexhaustible source of hydrogen for thermonuclear power can become the water. The initiative O.Lavrent'ev to create a magnetic trap for the hot plasma found support of academics Andrei Sakharov and Igor Tamm. In October 1950, they offered a toroidal device with longitudinal magnetic field to keep the hot plasma, now known as the tokamak. The world's first toroidal unit with a strong longitudinal-magnetic field TMF (torr with the magnetic field) was built in 1955 in the USSR. In 2015 in of the modernized tokamak TM-15, the duration of plasma confinement in the stationary regime was less than 1 s, but according to of the project, the duration of plasma confinement in of the modernized tokamak TM-15 should be 5-10 seconds.

Oleg A.Lavrent'ev (07.07.1926 – 10.02.2011) Andrei D.Sakharov (21.05.1921 – 14.12.1989) Igor E.Tamm (08.07. 1895 – 02.04. 1971)

Figure2. *The initiators of the research into controlled thermonuclear fusion based on the tokamak*



Poloidal section of ITER reactor The cross section of the Tokamak TM-15

Figure3. *(a)To estimate the size of ITER in the lower part of the figure shows the silhouette of a man. (b) placing the TM-15 tokamak in the experimental room*

3.2. Real Electrodynamics Inside the Tokamak

Tokamak is a toroidal chamber with magnetic coils, designed for magnetic plasma confinement in order to achieve the conditions necessary for the occurrence of controlled thermonuclear fusion. To create the magnetic trap uses a combination of magnetic fields: strong toroidal field **B**t and a weaker (100 times) poloidal field **B**p, as well as the **B**i field current I, flowing through the plasma column. It is believed that the plasma is stable in a tokamak if the criterion Shafranov - Kruskal:

$$\mathbf{B}t / \mathbf{B}i > R / \alpha \quad (19)$$

Where R - radius of the circumference of the plasma ring, α - the radius of the cross section of the plasma column.

However, due to the effect of self-generation strong toroidal magnetic field **H**t poloidal magnetic field **H**p, and vice versa, hold the plasma in a tokamak a long time is not possible. The more intense toroidal magnetic field generated by the windings of the toroid, and it reaches 3-5Tl in the tokamak, the more intense extra poloidal magnetic field will be created by it. Chief Scientific Officer of the Siberian Branch of the Russian Academy of Sciences, professor V.V. Aksenov experimentally and mathematically substantiated the effect of self-excitation and the uncontrolled growth of magnetic fields. This leads to uncontrolled instabilities of plasma column [10, 13]. Self-excitation process will grow almost instantly due to the mutual generation of the above-mentioned magnetic fields. According to the electrodynamics developed by Professor V.V. Aksenov, the magnetic field inside the tokamak obeys the following equations:

$$\mathbf{H}_T = \nabla^{\times}(Q\mathbf{r}), \qquad \mathbf{H}p = \nabla^{\times}\nabla^{\times}(Q\mathbf{r}),$$

$$\nabla^{\times}\mathbf{H}_T = \mathbf{H}p \qquad \nabla^{\times}\mathbf{H}p = \chi\mathbf{H}_T \tag{20}$$

In this case, the effect of self-generation by a strong toroidal magnetic field Hm of the poloidal magnetic field Hp and vice versa is possible only in a conducting medium when the parameter $\chi \neq 0$ [13]. Here Q is a scalar function of three or four variables, if we take into account the time dependence, and r is the radius vector. Vortices of a toroidal magnetic field create a force poloidal magnetic field and vice versa. This is one of the variants of the so-called dynamo excitation of a magnetic field. When the temperature rises inside the tokamak diffusion rate will also increase due to the growth of the resistance (conductivity drop) the plasma column and growth of the poloidal field inside the tokamak. V.V. Aksenov conducted an estimation of self-excitation in the large model T-15 (Fig. 3a) according to his equations (2) of electrodynamics. The results are as follows [13]. If we assume $\nabla^{\times} \approx 1/L$, where L is the linear dimension of the plasma pinch inside the tokamak, then:

$$(1/L)\cdot\mathbf{H}p \approx (\Upsilon/\eta)\cdot\mathbf{H}_T\,, \qquad (1/L)\cdot\mathbf{H}_T \approx \mathbf{H}p \tag{21}$$

Where Υ is the diffusion rate of the field in the torus plasma, η is the magnetic viscosity.

Let the small radius of the plasma filament R = 2m, then $L = 2\pi R = 4\pi$ m, and the intensity of the toroidal magnetic field $|\mathbf{H}_T| = 5$Tl. The intensity of the additional poloidal magnetic field excited by the toroidal magnetic field will be of the order of

$$|\mathbf{H}p'| = 5/4\pi \text{ Tl} \sim 0{,}4\text{Tl}.$$

In this case, the estimate of the diffusion rate with respect to the original magnetic fields is as follows

$$\Upsilon = (\eta/L)(|\mathbf{H}p|/|\mathbf{H}_T|) \tag{22}$$

The additional toroidal magnetic field will increase by an amount

$$\mathbf{H}_T' = (\eta/L\Upsilon)\,\mathbf{H}p' = (\mathbf{H}_T/\mathbf{H}p)\,\mathbf{H}p' \tag{23}$$

In conclusion, Professor VVAksenov notes that “the above approach to the description of electrodynamics in a tokamak needs a more thorough analysis involving the Boltzmann equation describing the behavior of plasma particles with increasing temperature in a complex magnetic field different from the toroidal one that arises in a tokamak due to self-generation. At the present time, electrodynamics in a tokamak is described by the well-known classical Maxwell equations ... “[13]. In article [10], the mutual generation of force and non-force magnetic fields is formulated by V. Aksenov in strictly mathematical formulas, and the appearance of these fields is determined by the theorem on total electric currents in spherical regions. This points to the inaccuracy of research only magnetic fields and refusing to study electric currents when calculating the electrodynamics of tokamaks.

Today in EAST tokamak Chinese Institute of Plasma Physics succeeded in a record time of plasma confinement during the 30s, and in the ITER project is necessary to achieve the following: at steady state Pfus = 0,4-0,5 GWt and Q> 5 and to bring the length of the plasma confinement before 3000s. In the natural fusion reactor, such as the Sun, regularly observed coronary solar plasma emissions, which indicates the instability of a solar reactor. Such plasma emissions from a fusion reactor could lead to an environmental disaster.

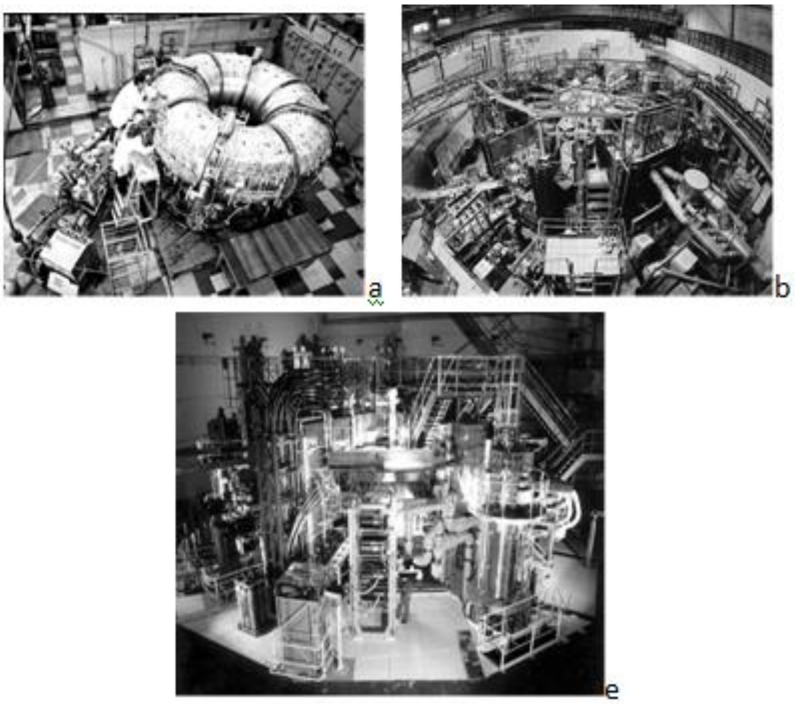


Figure4. *Tokamaks with superconducting coils: (a) the assembly of the superconducting coils of the tokamak T-7, (b) T-15, (e) ITER*

4. Large Hadron Collider And Accelerators

4.1. Real Electrodynamics Inside the Accelerators and Collider

The problem of the interaction of the space environment with electromagnetic energy of the moving charge, and replacement of the controversial idea of increasing the mass of the moving charge to infinity when approaching the speed of light, a more acceptable from a physical point of view of understanding of the deformation of the electric field of a moving charge and reduced to zero the force of interaction with him. The initial energy of the electric field of a stationary charge is reduced when driving this charge in the amount of energy detected magnetic field, ie the magnetic energy in the environment around a moving charge does not appear, as is commonly believed, and extracted from it. The initial energy of the electric field of a stationary charge $\mathbf{W}_{E0}$ decreases when moving this charge an amount equal to the complete energy of the detected magnetic field $\mathbf{H}c=(v/c)\mathbf{E}$. Interaction of electric charge e and the electric field **E**0 is, given the retarded potentials and distortion of the electric field **E** of the moving charge, It is described by the dependence [3]:

$$\mathbf{F} = \mathbf{E}_0\, q \sqrt{1- v^2 / c^2} \tag{24}$$

Taking into account the mass of the charge and acceleration α, the dependence (24) can be written in the form:

$$\mathbf{F} = \mathbf{E}_0\, q \sqrt{1- v^2 / c^2} = m_v\alpha \neq \frac{m_o\alpha}{\sqrt{1-\frac{v^2}{c^2}}} \tag{25}$$

Within the framework of the relativistic concepts of modern electrodynamics dependence (25) is interpreted as the effect of "increasing the mass" m_o moving charge to infinity when approaching the speed of motion of the charge to the speed of light. However, equation (25) is a relativistic effect of reducing the force interaction of the moving charge with the electric field $\mathbf{E}_o$, formed by a stationary charge. The basic relativistic relation between energy and momentum is true at any speeds:

$$E^2 = P^2c^2 + m^2c^4 \tag{26}$$

But, the effects of delayed potentials and deformation of the electric field of moving charges leads to a restriction of the growth of the mass of the charge, at v→c. The increase in charge mass at a rate occurs for other reasons. When the oscillation frequency of the electromagnetic field that occurs when a particle moves in the dark matter $\omega_B = \frac{mv^2}{\hbar}$, close to the natural frequency of oscillation of the particle $\omega_S = \frac{mc^2}{\hbar}$, resonance occurs. Resonance is accompanied by an increase in the additional mass of the particle:

$$\Delta m = \hbar\, \omega_r / c^2 \tag{27}$$

The standard graph of the dependence of the particle's mass on its speed is now simply half the amplitude-frequency characteristic of the forced oscillations of a harmonic oscillator with no dissipation, and the mass growth is absolute [1].

If the increase in mass of from the particle velocity is determined frequency of oscillation of a particle when it moves in dark matter and has a limit associated with the resonance frequency, the energy growth of electron or proton in the particle accelerator will also stop at this limit. In this case, the amplifier consumes no energy to increase the mass and energy the electrons. The amplifier uses energy to compensate for the effect of reducing the force interaction of the moving charge with the electric field E_o, formed by a stationary charge. Create colliders with proton energies of 7000 GeV is a difficult task. Changes of the mass and charge of the particles at v→c, as well as the deformation of the electric field of a moving charge requires further experimental study and corrections the theory accelerators and colliders. The real energy of the protons in opposite flows in the collider should be much less than stated, and the processes of birth of new particles in the collision of protons differ from those predicted theoretically because of the presence of dark matter. It should be noted that the acceleration of charged particles to "relativistic speeds ", at v → c, gives an interesting and very important effect. The fact is that under such speeds, particles (eg, protons) loses its charge due to the effects of delayed potentials and deformation of the electric field of moving charges, becomes quasi-neutral and can freely penetrate into matter the target, to overcome the Coulomb barrier energy. Thus, the particles can initiate nuclear reactions such as the synthesis of heavy elements. An even greater extent this applies to the accelerator opposite flows (colliders), when the colliding particles are quasi-neutral and a potential barrier is virtually absent.

4.2. The Method of Measuring the Energy of Relativistic Particles

The method of measuring the energy of relativistic particles by the deviation of charged particles in a magnetic field does not take into account the deformation of the electric field of moving charges and the decrease to zero of the interaction force with it and is therefore the unacceptable. The most common instruments for the accurate measurement of the energy spectrum of constant and pulsed beams of charged particles are magnetic spectrometers. This method is based on the dependence of the radius of the cyclotron orbit on the kinetic energy of the particle. The equality of the Lorentz force and the centrifugal force when the particle moves around the circumference in a homogeneous magnetic field leads to the equation:

$$qvB = \frac{mv^2}{r} \tag{28}$$

Where q is the particle charge, v is its velocity, B is the magnetic field induction,

r is the radius of the cyclotron orbit, $m = m_o / \sqrt{1 - v^2 / c^2}$, m_o = rest mass,

c is the speed of light.

From the known q, r, B, we can calculate the kinetic energy of a particle:

$$W = m_o c^2 \{ \sqrt{\frac{q^2 \mathbf{B}^2 \mathbf{r}^2}{(m_o c^2)^2} + 1} - 1\} \tag{29}$$

In modern spectrometers, an approximate relation is used to estimate the kinetic energy of ultra relativistic charged particles in a magnetic field when $qBr >> m_o c^2$ [15].

$$W \approx q\mathbf{B}r \tag{30}$$

Where q is the particle charge,

B is the induction of a homogeneous magnetic field,

r is the radius of a circle described by a particle.

It is seen from expression (30) that the kinetic energy of a charged particle in a magnetic spectrometer is directly proportional to the charge value, which in classical electrodynamics does not depend on the velocity of the particle, and the radius of the cyclotron orbit, which is determined experimentally in the spectrometer with the help of Faraday's cylinders.

5. Conclusion

The above article show that fundamental physics is on the verge of a new round of development. For this society's demands relatively of environmental safety are urgently needed. Einstein's relativistic theory has exhausted itself and the creation on its basis of high-tech, very powerful and terribly expensive accelerators, colliders and tokamaks at best will be a waste of time and money, and in the worst case can lead to an ecological catastrophe of a global scale. These risks are caused by the lack of a full theory of electrodynamics, which could adequately describe the actual behavior of electric and magnetic fields and currents in vacuum installations in the presence of dark matter.

For tokamaks, the risk is further exacerbated by the fact that all fusion programs are based on heating and compressing the reacting material and at the same time have an adjective "controllable", although there is no control at all. Just the initial amount of the reacting substance is prudently taken very small. In quantum physics, there are no ways to influence this process. In future models of the reactors in contrast to all existing projects will react in any moment of time only the smallest part of deuterons, which automatically selected relative to initial phases. It could be possible to obtain in result the small energy generating during long period of time until the reserve of light reacting nuclei will not be exhausted. That cold nuclear fusion does have the right to be called "controlled" [8].

The lack of a full-fledged theory of electrodynamics casts doubt on the reliability of experimental results, obtained on the Large Hadron Collider and accelerators. The method of estimating the energy of relativistic charged particles, based on measuring the deviation of the particle trajectory in a magnetic field, does not allow one to obtain true values of the particle energy. A new technique is needed to accurately measure the energy of relativistic particles.

I want to finish the article with Nikola Tesla's words: "Matter is structured from dark matter (ether) and dissolves again in it, it follows from elementary physical laws, but if of the generated energy is more than the vanished one, cosmic catastrophes occur." [16].

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