POLYTRONIC MODEL of ELECTROMAGNETISM

<u>The magnetic moment</u> of a ring coil of an electrical current is equal to product of a current ***I*** by square ***S***, surrounded by the coil. The vector of a magnetic moment is determined by a rule of a right corkscrew.

$$\vec{p}_I = [I \cdot S] \qquad |A \cdot m^2|$$

As well as in the case with electrical dipole moment p_l, the dimension of a magnetic moment p_I has rather foggy physical sense

$$|A \cdot m^2| = |(C \cdot m^2)/s| = |N^{1/2} \cdot m^2|$$

which does not allow to calculate force of interaction between two dipoles by multiplication of their values.

The magnetic moment of electron is equal

$$\mu_e = 1.0011596389 \cdot \mu_B = 9.284851 \cdot 10^{-24} \qquad |A \cdot m^2|$$

where μ_B – magneton of Bohr.

The complexity of the problem consists that the response of electron to an external magnetic field can be detected only at moving of it. Whether there is a magnetic field for an unmovable electron it is impossible to state categorically. The unmovable electron displays its presence at the given point of space only by means of electromagnetic radiation.

If unmovable electrons have a magnetic moment, then, located by a lamina on a surface of metal, they should create a constant magnetic field.

Anything similar in experiment is not watched.

Moreover, the phenomena of superconductivity indicates that the magnetic field can exist and at absence of the electric field. For example, inside the volume, protected by the superconducting screen, the residual magnetic field is saved which existed there at the moment of transition of the screen into the superconducting state.

After the invention of vacuum electron devices for physicists the unique possibility of research of the magnetic field of "pure" electronic stream has appeared. Unfortunately, this possibility is not utilized properly till now.

With the help of lines of force it is possible to invent of dozen models of magnetism, but any of them cannot comprehensively give the explanation and quantitative correspondence with outcomes of experiments.

Taking into consideration the fact, that superconductors are only some metals in the Mendeleyev's table, we have put into basis of polytronic model of magnetism the energy of radial oscillations of polytrons.

At lowering temperature of superconductor all polytrons, both bound in atoms, and free between atoms, tend to pass to more high frequencies of own resonance oscillations. At temperatures close to absolute zero the polytrons of superconductors have upper boundary frequency of own resonance oscillations. Below than temperature of superconductivity the boundary frequency remains invariable. The metal passes into superconducting state in that moment, when all polytrons reach the boundary frequency.

Among six sorts of resonance energy of polytrons most insensitive to the frequency change is the radial component of energy of radial polytron.

$$W_r(m, n_r) = 6 \cdot \pi \cdot M_e \cdot c^2 \cdot \left[\frac{0.1875 \cdot m^4 \cdot n_r^4}{m^4 + 0.1875 \cdot n_r^4} \right] \quad |J| \qquad (7\text{-}2)$$

The force of interaction between two ring currents, which are created by moving of the charge q with speed v on an orbit of diameter D, and which are located on one axis ***z*** "by the face to each other" is evaluated under the formula.

$$F_m(z)=\frac{q^2\cdot v^2}{2\cdot\pi\cdot 10^7}\cdot\int_0^{2\pi}\frac{z\cdot\cos\varphi\cdot d\varphi}{\left[z^2+D^2\cdot\cos^2\left(\frac{\varphi}{2}\right)\right]^{\frac{3}{2}}}\quad |N| \qquad (7\text{-}11)$$

Further, utilizing the assumption, that the charge is not electron and, therefore, it has no mass, we can apply the formal substitution

$$q\cdot v = N\cdot q_e\cdot v = N'\cdot q_e\cdot c$$

which allows writing formula (7-11) as

$$F_m(z)=\frac{q_e^2\cdot c^2}{2\cdot\pi\cdot 10^7}\cdot(N')^2\cdot\int_0^{2\pi}\frac{z\cdot\cos\varphi\cdot d\varphi}{\left[z^2+D^2\cdot\cos^2\left(\frac{\varphi}{2}\right)\right]^{\frac{3}{2}}}\quad |N| \qquad (7\text{-}11a)$$

where $N = q/q_e$ – amount of elementary charges creating the current in each ring.
The same way formally we can consider two rings, in which $N' = 1$.
The formula for calculation of a magnetic moment of radial polytron concerning a pole O, which is distant in r from center of polytron looks like:

$$p_m(m,n_r,r,\theta)=\frac{q_e\cdot c\cdot 10^9\cdot\sin\left(\frac{\theta}{2}\right)}{\sqrt{\frac{r}{D}}\cdot\left[1+1.324572\cdot\left(\frac{r}{D}\right)^2\right]^{\frac{3}{4}}}\cdot\sqrt{\frac{0.1875\cdot m^4\cdot n_r^4}{m^4+0.1875\cdot n_r^4}}\quad |N^{1/2}| \quad (7\text{-}12)$$

where θ – an angle between radius-vector r and plane of polytron.

The force of magnetic interaction between two radial polytrons is equal to product of their magnetic moments

$$F_{mij}=p_m(m_i,n_{ri},r,\theta_i)\cdot p_m(m_j,n_{rj},r,\theta_j)\qquad |N| \qquad (7\text{-}13)$$

In Fig.6 the dependence of magnetic moment of radial polytron of angle θ is shown.

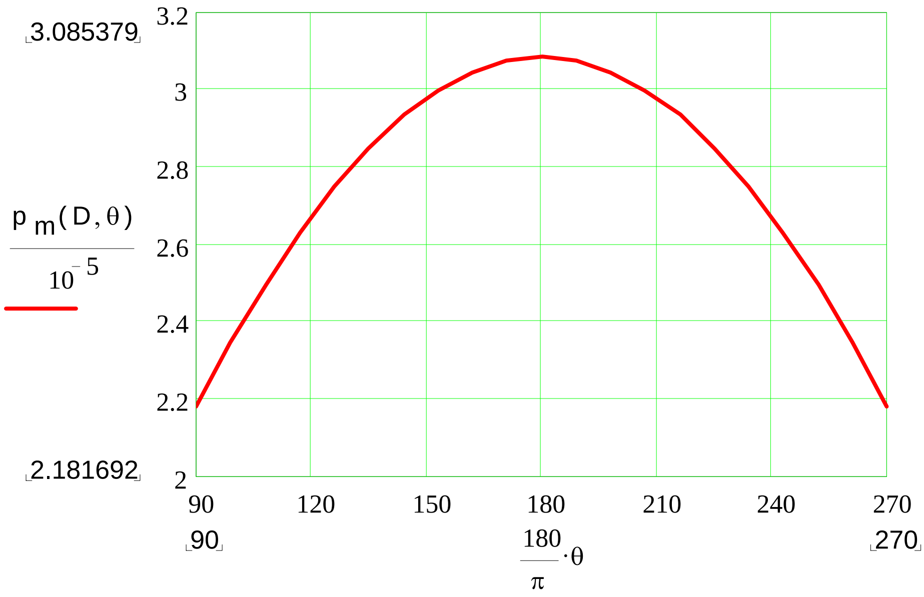

Fig.6

The dependence of magnetic moment of radial polytron of angle θ between radius-vector r and plane of polytron

The electrical moment of radial polytron is determined by the energy of tangential oscillations and, in contrast to the magnetic moment, essentially depends on an oscillation frequency.

$$p_q(m,n_r,r,\theta)=\frac{2\cdot q_e\cdot c\cdot\sqrt{r}\cdot n_r^2\cdot\sin\theta}{D^{\frac{3}{2}}\cdot\left[1+18.254\cdot\left(\frac{r}{D}\right)^2\right]^{\frac{3}{4}}\cdot\sqrt{m^2+0.298^2\cdot n_r^2}}\quad |\mathrm{N}^{1/2}|\qquad (7\text{-}14)$$

In Fig.7 the dependence of electric moment of radial polytron of angle θ is shown.

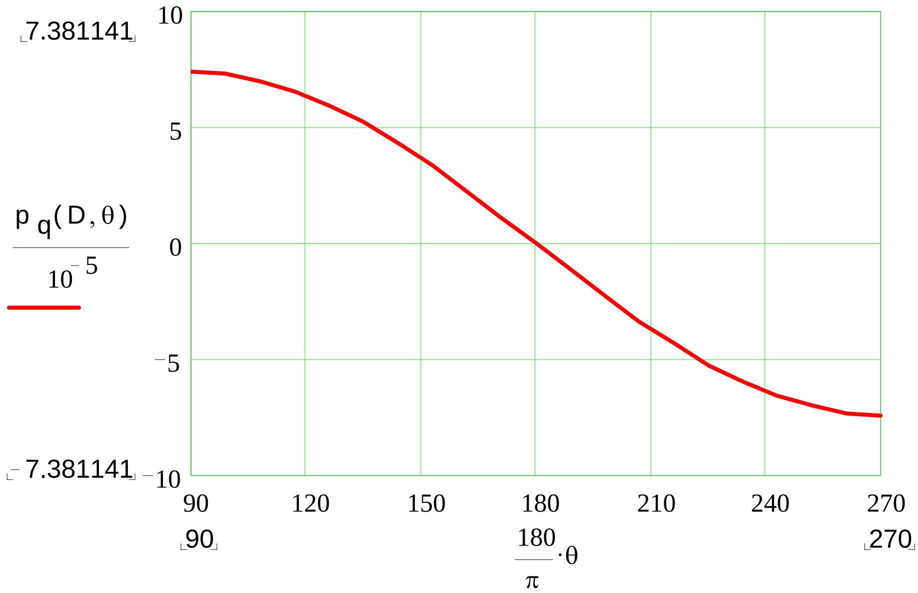

Fig.7
The dependence of electric moment of radial polytron of angle θ between radius-vector r and plane of polytron

The volumetric densities of magnetic and electrical energy are proportional to quadrates of their moments (see Fig.8).

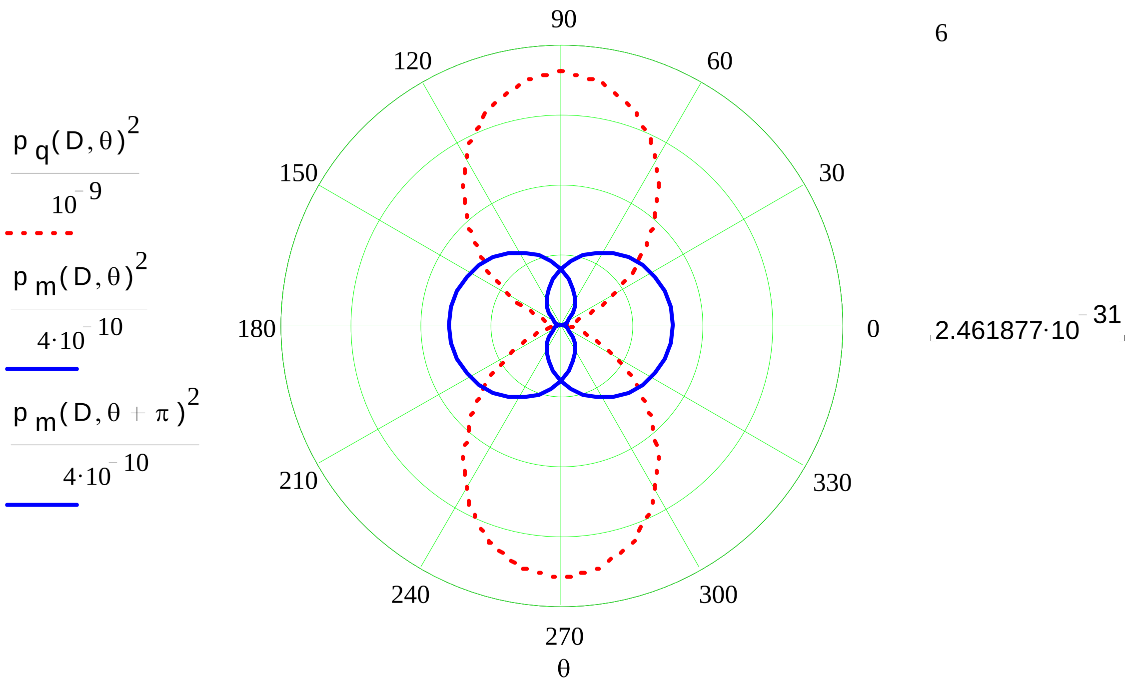

Fig.8
The polar diagram of allocation of volumetric density of magnetic energy (solid line) and of electrical energy (dot line) of radial polytron

The force of magnetic interaction between two radial polytrons is equal to product of their magnetic moments

$$F_{qij} = p_q\left(m_i, n_{ri}, r, \theta_i\right) \cdot p_q\left(m_j, n_{rj}, r, \theta_j\right) \qquad |N| \qquad (7\text{-}15)$$

The analysis of the equations of the magnetic and electrical moments of radial polytron speaks that their values and directions are coupled to a change of some parameters of speed of light. In our paper "On intercoupling of some physical constants" the following equation for the charge was obtained

$$q_e = \sqrt{\frac{h \cdot 10^7}{1.08612 \cdot K^4 \cdot 2 \cdot \pi \cdot c}} = 1.6021764 \cdot 10^{-19} \qquad |N^{1/2} \cdot s|$$

The product $q_e \cdot c$ depends only on speed of light

$$q_e \cdot c = \sqrt{\frac{h \cdot c \cdot 10^7}{1.08612 \cdot K^4 \cdot 2 \cdot \pi}} = 4.8032 \cdot 10^{-11} \qquad |N^{1/2} \cdot m|$$

Therefore, the well-ordered moving of energy of polytrons, which is determined by the constant c = 299792458 |m/s|, is the reason of origin of magnetic field.

In order to check up an accuracy of this assertion, it is necessary to fulfill the following experiment, see Fig.9.

Moving of ring with current J in uniform magnetic field

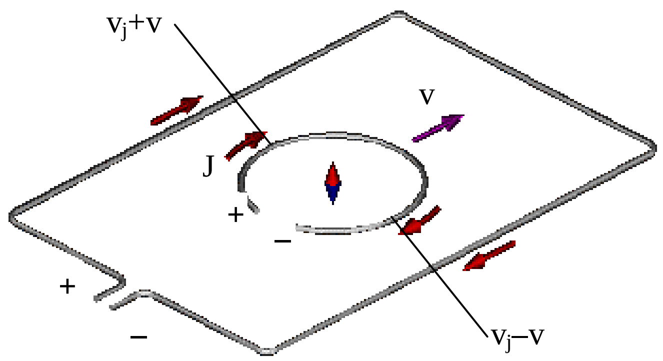

Fig.9
The scheme of experiment for definition of the nature of magnetic field

The framework with the direct current conditionally figures the direction of an external homogeneous magnetic field. In the magnetic field of this framework the ring with the current J, manufactured from a superconductor, is moving.

We can expect the following outcomes of experiment:

1) If in the left part of the ring the speed of positive charges v_j is summarized with speed of moving of ring v, in this case the ring will be shifted to the left.
2) If in the right part of the ring the speed of negative charges is summarized with speed of moving of ring, in this case the ring will be shifted to the right.
3) If the motions of both types of charges balance each other, or, if in the ring in general there is no moving of charges, in this case the ring will not be shifted.

The outcome of this experiment will allow to clear up an influence of speed of light onto the nature of electrical and magnetic fields.