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HYPOTHESIS ON FORMATION OF THE MAGNETIC FIELD OF THE EARTH

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ABSTRACT

This article defines developed hypothesis based on the dipolar theory on Earth magnetic field with the purpose of identifying and revealing importance of physical process in atmosphere and Earth magma, as well as importance of electrical macrodipolar in convergence of Earth into magnetic macro-dipolar has been explained.

In order to describe meaning of hypothesis on new ideas related to Earth magnetism, provided are illustrated diagrams of physical process. It has been proven that in the course of research, developed is hypothesis on dipolar theory, its importance in geomagnetism and physical process has been explained.

This hypothesis can be applied during study of magnetism theory and creating a new electrical dipolar theory on Earth geomagnetism, as well as in the course of physics education process.

Keywords: Earth, magnet, magnetite, mineral, whirl, field, dipolar, magma, core, process, scheme, precession, inclination, pole, layer, axis, course, physics

INTRODUCTION

Most of the planets in the solar system have a certain degree of magnetic field: Jupiter, Saturn, Earth, Mercury, Mars and others [1]. The Earth's magnetic field is an area around the planet, where magnetic forces act, which protect the entire living world from cosmic radiation, the intensity on the planet's surface is 5 · 10–5 T [1,2].

Many scientific papers with different views have been published on the formation of the planet's magnetic field, but the question of the origin of the Earth's magnetic field has not yet been finally resolved [2]. The Earth consists of a solid crust [3], a mantle [4] with semi-solid and liquid shells with outer and inner cores [3,4], a gas sphere up to 690 km high, its dense part is about 400 km, multicomponent in composition [5], which is a protective shield of a living organism and civilization on the planet.

The Earth with a radius of 6378.1 km with a density of 5.5.103 kg / m3, consists of an atmosphere with elements such as nitrogen (78.08%), oxygen (20.95%), inert gases, water vapor and dust (0.97%) [5], under which, at a depth of 2900 km, there is an outer liquid core with a thickness of 2200 km and an inner core (radius 1220 km with a density of about 12.5 t / m^3 and a pressure of up to 3.7 million atm., A temperature of 5960 ± 5000C) [6, 7].

1. The Earth with an internal high-temperature solid core (magnetic macro-dipole) [8], rotating along the axis is displaced along an ellipsoidal trajectory around the Sun. When the planet rotates, friction arises between the gas envelope with the crust and the hydrosphere, in the process the multilayer atmosphere is charged positively, and the Earth is negatively charged [2] and a spherical electrical capacity is formed, consisting of a vertical n-th number of electric micro and macro dipoles (Fig. 1). Cosmic charged particles (protons 92%, alpha particles - 7%, and other -1%) and rays (gamma quanta) [8], which enter into a reaction between themselves and the components of the gas sphere, form electric macrodipoles with the surface of the planet (Fig. 1.) [8,9]. In the Earth's ionosphere at an altitude of 90 - 400 km, there are ionized D, E and F layers with a plasma density

N = $10^{23} \div 10^{24}$ particles per m3 [5], with which multi-row vertical electric macrodipoles (like hedgehog needles) are formed between the planet's surface. The cosmic flux of radiation coming to the Earth from the galaxy and the solar wind [8 a], consists of almost the same number of negative and positive charged particles that rotate with the planet, mutually form and line up as chains of electric dipoles across the thickness of the atmosphere (Fig. 1). The distance between the poles of the chains of the formed electric micro and macro dipoles fluctuates depending on the charge density in the medium from several microns to 1.0 m.For example, for a dry atmosphere, 1,0 mm corresponds to a potential

l. U ≈ 1.0 kV, with an increase in the value of the charge between With the poles of electric dipoles, annihilation processes occur with weak discharges or powerful discharges, as in the form of lightning, with the successive decay of chains of electric dipoles in the atmosphere at distances of up to 50-150 km.

The electric potentials of macrodipoles with the upper layers of 150-200 km to the Earth's surface reaches U ≈ 400 kV with a current density j ≈ 10^{-12} A / m^2 [2.8]. A huge number of macrodipoles rotate, as noted above, together with the planet, some of which can decay with annihilation, the main part of the layered plasma of the gasosphere first excites a powerful vortex electric field around the planet, similar to a spherical belt, then a powerful vortex magnetic field is excited around this belt, which is one of the sources of the magnetic field of the the Earth [2,5,9] (Fig. 2).

2.It is known that in the initial period of the formation of a rotating Earth under the action of a vortex centripetal force, its crust gradually became denser, compressed under the influence of the gravity of the upper layers of rocks and in the center of the planet the internal pressure (several million bar) and temperature (several thousand degrees) increased [4], a mantle with layered liquid magma was formed. In this process, the high-temperature magma of the Earth was formed, consisting of liquid layers and a solid central core (magnetic macrodipole), which, during joint rotation and the appearance of charges in them due to friction between the magma

layers with the core, formed electric macrodipoles in it (Fig. 3), around the latter, eddy induction currents were excited in the magma layers, due to this the planet has a magnetic property.

In the initial period of the formation of the Earth, thermonuclear synthesis of hydrogen took place with the formation of light chemical elements, then heavier ones under the influence of high temperature and pressure due to vortex centripetal motion in absolutely liquid layers of magma, the process of crystallization of components with iron, such as nickel, chromium, cobalt, aluminum, began. titanium, vanadium, magnesium, manganese and with others the mineral magnetite was formed [9]. The crystallization process continued for a long time, under the influence of high pressure and temperature, the amount of solid mass, volume and density increased up to $\rho = 14.3$ g / cm^3 of the magnetic macrodipole [6,7,8,9,10].

In the center of the magma over time, physical processes took place: as cooling with a crystal-like solidification of the core due to the displacement of its thermal energy to the layers of the mantle and the planet's crust, a large ($R > 10^6$ m) rotating, interlocking clot of minerals - magnetite was formed [9,10,11], ie magnetic macrodipole as a powerful internal source of the Earth's magnetic field. The magnetic south pole of the macrodipole is directed to the north magnetic pole of the galaxy, for this reason the magnetic and geographic poles of the Earth are oppositely located.

3. A rotating high-temperature solid core - a magnetic macro-dipole is a source of a magnetic field that excites induction and eddy currents in layers of liquid magma [4,7,9], a powerful vortex magnetic field is formed around these currents, which is one of the powerful internal sources of the magnetic field of the Earth ...

Consequently, under the influence of a magnetic field, a rotating solid magnetic macro-dipole excites induction and eddy currents (Faraday's and Foucault's laws) in the layers of massive liquid magma, around which a vortex magnetic field is formed as a source of the Earth's magnetic field [(9)].

Induction currents generated in magma under the action of the magnetic field of a macrodipole also excite an additional powerful magnetic field, due to which supposedly resonant currents with a magnetic field are formed due to the coincidence of the frequency of induction currents (according to the law of resonance) and the power of the planet's internal magnetic field increases sharply. For this reason, the core of the Earth has a high internal magnetic field. Some of the generated induction and eddy currents are converted into thermal energy and heats the magma [9].

The magnetic field of the Earth consists of the following field sources:

1. The formed electric macrodipoles in the gas sphere of the planet due to friction with the crust and hydrosphere during the period of the vortex motion of the Earth, vortex electric fields are excited around the chain of macrodipoles, which are the source of the vortex magnetic field of the Earth.

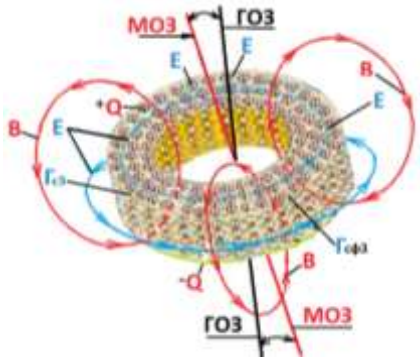

Fig.1

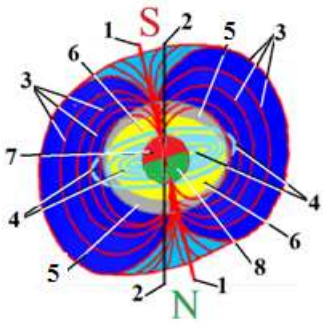

Fig.2

Diagram of formation of the magnetic field of the Earth:

Fig. 1 - Scheme of the formation of vortex electric and magnetic fields in the atmosphere: B and E - magnetic and electric fields; + Q and –Q - positive and negative - new charges in electric dipoles;

МОЗ and ГОЗ are magnetic and geographic axis of the Earth; Fig. 2. 1 and 2 are magnetic and geographic axes of the Earth; 3 and 4 are magnetic and electrical fields of the Earth; 5-mantle of the Earth; 6-liquid magma; 7 and 8 - magnetic poles of dipole; S and N - poles of the Earth.

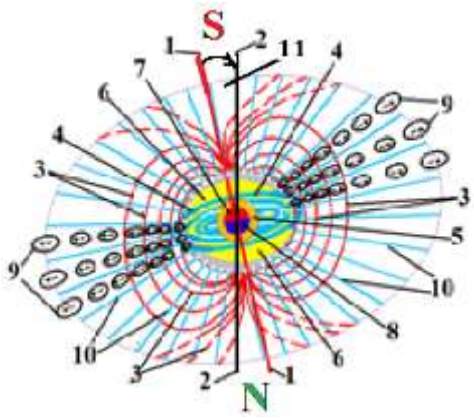

Fig.3.

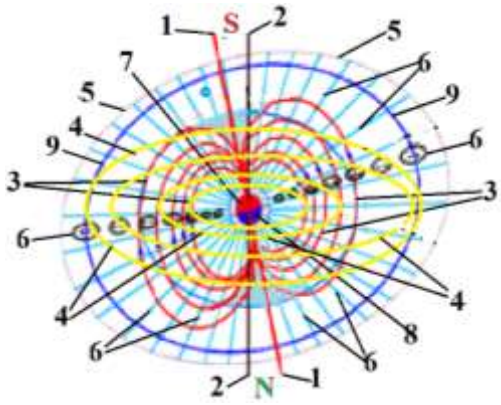

Fig.4.

Diagram of formation of vortex electric and magnetic fields around a magnetic macrodipole (Fig. 3) and location of electric dipoles in the atmosphere (Fig. 4).

Fig. 3. 1 and 2 are magnetic and geographic axis of the Earth; 3 and 4 are vortex magnetic and electric fields of the Earth's macrodipole; 5 and 6 are liquid and semi-liquid magma layers; 7 and 8 - poles of the Earth's macrodipole; 9 and 10 are chains of electric dipoles in the atmosphere; 11 is declination angle of the magnetic and geographic axes of the Earth.

Fig. 4. 1 and 2 are magnetic and geographic axes of the Earth; 3 and 4 are vortex magnetic and electric field of the Earth's macrodipole; 5 is the upper boundary of the Earth's gas sphere Electric field of the Earth's macrodipole; 5 is the upper boundary of the Earth's gas sphere 6 - the chains of electric dipoles; 7 and 8 - poles of the magnetic macrodipole; 9-vortex electric field of the Earth's atmosphere.

2. The magnetic field of the rotating macrodipole of the solid core of magma - the mineral magnetite, is a powerful internal source of the Earth's magnetic field.

3. Induction eddy currents excited with a vortex field of a magnetic macrodipole in the magma layers and eddy currents formed in massive liquid layers of the mantle in the outer and inner cores of the planet are powerful internal sources of the Earth's magnetic field.
The scientific world knows that the magnetic and geographic axes of the Earth do not coincide, since during rotation the planet experiences a precession phenomenon [12], in this magma with a solid core of the planet is inclined from the vertical axis at a small angle (11.50) from the geographic axis under the action centrifugal and Coriolis forces [13,14]. For this reason, the magnetic and geographic axes of the Earth do not coincide.
According to the above-stated, the Earth has a magnetic field, like a Geomagnet.
On the basis of the study, a scientific hypothesis was proposed with the name "Hypothesis of formation of the magnetic field of the Earth" and a diploma was obtained for the scientific hypothesis URKUNDE No. 02Г-2019 as per the decision of the International Expert Council of the European Academy for Natural Sciences (EANW). http://www.eanw.org/

Subject: HYPOTHESIS ON FORMATION OF THE MAGNETIC FIELD OF THE EARTH
The formula of the hypothesis: The hypothesis was theoretically justified on assumption of regularity of formation of the Earth's magnetic field, which is based on emerging of an electric macrodipole due to polarization of various layers of the planet, during its rotation and transformation of the created vortex electric field in a vortex magnetic field, while a macrodipole can be formed in accordance with the following processes:
- Polarization of the gas layer with the planet's crust and hydrosphere;
- Friction between layers of liquid magma and solid core of the earth;
- Different ionization of atmospheric layers differing in density and composition;
- Declination of the magnetic axis from the geographic to a small angle under the action of the centrifugal and coriolis force during the precession of the planet with a rotating gas sphere of the atmosphere and a solid core of magma.

CONCLUSION

A review of the available scientific and educational literature related to the magnetism of the Earth, their analysis revealed that certain physical concepts and definitions of the essence of magnetism are not sufficiently disclosed. Given this fact, we propose the above hypotheses for the scientists' reasoning.
1.In the course of physics, some concepts and definitions of magnetism can be explained in terms of electric dipole theory.
2. Electrical conductivity in electric circuit is carried out under the action of a potential difference and due to the rotation of spherical proton-electron dipoles in the atoms of a substance.
3. Electrostatic dipole due to vortex rotation along the axis under the action of an external force at the beginning of the process turns into a vortex electric field, then a vortex magnetic field is triggered around it.
4. As a result of one-sided vortex rotation (spin) of electric dipoles in the atoms of a substance, consisting of proton-electron pairs, eddy currents are formed, which excite a vortex magnetic

field around themselves, these substances due to this process have a magnetic property, from which permanent magnets are formed.

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