

Dark Matter Domains as Volume Resonators of Electromagnetic, Gravitational and Spin Energy

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Abstract: The article says that based on the results of numerous astronomical observations and laboratory experiments, it can be argued that quantum vacuum (dark matter) can accumulate the electromagnetic, gravitational and spin energy in certain areas of space (domains) that are volume resonators. Under extreme conditions, quantum vacuum (dark matter) can return the accumulated energy to the baryon world in the form of tornadoes, ball lightning, of pulsed radiation of the giant power of supernovae and the monstrous gravity of black holes.

Keywords: quantum vacuum; dark matter; polarization; resonators; domain, tornadoes.

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1. INTRODUCTION

The impetus for writing this article for me was the acquaintance with the work of the head of the department of the National Research University of MPEI, Professor F. Shakirzyanov “On Photon Domains” 2017 and, in particular, the mechanism for transferring some of the energy of stars to the electromagnetic phase using photonic domains [1]. In the article, Professor F. Shakirzyanov considers the features of a new substance discovered by him - photon space. However, in my opinion, the role of such a substance is more suited to quantum vacuum (dark matter), which can accumulate electromagnetic energy to a certain critical value and then, when extreme values are reached, splash it into the baryon world in the form of pulses of radiation of giant supernova energies and monstrous black gravity holes.

2. POLARIZATION OF QUANTUM VACUUM (DARK MATTER)

Consider the features of the electromagnetic field in a vacuum from the point of view of classical electrodynamics. First of all, this is a medium with absolute dielectric and magnetic permeabilities (ϵ_a , μ_a) equal to the dielectric and magnetic constants (ϵ_0 , μ_0):

$$\epsilon_a = \epsilon_0 = \frac{1}{36\pi} \cdot 10^{-9} \text{ F}\cdot\text{m}^{-1}; \quad (1)$$

$$\mu_a = \mu_0 = 4\pi \cdot 10^{-7} \text{ Gn}\cdot\text{m}^{-1}.$$

The electric strength of this medium should be infinitely high, due to the lack of charge carriers. This means that the electric field \mathbf{E} and the magnetic field \mathbf{H} , as well as the electromagnetic energy density determined by them in vacuum, can be infinitely large. Such a conclusion, obtained from the position of the theory of classical electrodynamics, in the high-energy region

was not consistent. In quantum electrodynamics, the instability of vacuum in external fields was experimentally established for electric field strengths $\mathbf{E}_s = 1.32 \cdot 10^{16} \text{ V} \cdot \text{cm}^{-1}$ (Schwinger's characteristic quantum electro dynamic field) and magnetic field strength $\mathbf{H} = 10^{16} \text{ T}$, caused by the creation of electron-positron pairs in a vacuum (polarization effect of the vacuum) due to which the vacuum itself becomes unstable. With the polarization of vacuum and its transformation into matter, the change in vacuum energy w can be represented as the sum:

$$w = w^p + w^\sigma \quad (2)$$

where w^p is the vacuum polarization, $w^p \ll E^2 / 8\pi$;

w^σ is the change in the energy of the substance at the production of particles

$$w^{\sigma} = eET\chi, \quad \chi = \frac{e^2 E^2 T}{4\pi^3} \exp\left(-\pi \frac{m^2}{\hbar E}\right)$$

The creation of particles is the main reason for the change in the energy of the vacuum. The small value of the reverse reaction w^p implies the limitation on the electric field E strength for a the given time T ($E_s \approx 10^{16} \text{ V} \cdot \text{cm}^{-1}$ is the critical Schwinger's field) [2]. The effect of the polarization of quantum vacuum can be logically explained by the existence of a special the dark matter that does not interact with electromagnetic energy photons, but which has gravity and forms a dark halo around galaxies (including stars and planets) [3]. From the above, it follows that quantum vacuum (dark matter) is macroscopically a polarizing medium. The ether model, which served as Maxwell's basis for writing the equations of electrodynamics, was replaced by the model of the quantum vacuum, as a polarizing medium, capable of being the missing link for creating a single picture of the physical world [4]. The basic idea of the existence of links between magnetic and spin polarizations, between electricity and gravity is simple: elementary particles for the most part simultaneously have electric charge and mass, magnetic moment and spin. The first three characteristics of the particles correspond to the three fields that these particles excite: the electric, gravitational and magnetic fields. It is natural to assume that the fourth field should be generated by spin and be called the spin or torsion field. In this picture, the quantum vacuum is involved in the transfer of all interactions in nature, and its interaction with baryonic matter can be considered as the fifth fundamental interaction. To date, the existence of four fundamental interactions (excluding the Higgs field) is reliably known: gravitational interaction; electromagnetic interaction; strong interaction; weak interaction. An analysis of the experimental data related to the study of the anisotropy of physical space suggests the existence of a fifth interaction (fifth force) [5]. It can be assumed that many polarizing physical phenomena in the baryonic matter and quantum vacuum (dark matter) should have the same nature and proceed identically. Quantum vacuum is involved in all fundamental interactions, but if the polarization of vacuum in electromagnetic interactions is accompanied by the formation of electron-positron pairs with the participation of exchangeable virtual photons, then during strong nuclear interaction the polarization of quantum vacuum is accompanied by the formation of three unstable π -mesons (π^0, π^+, π^-) with the participation of virtual exchange pions and the subsequent birth of short-lived protons and antiprotons. At the same time, the energy spectrum of the production of new particles and antiparticles changes, which indicates a change in the energy of a quantum vacuum when it is included in the nuclei of atoms [6]. The amazing flatness of our

Galaxy can be explained by the polarization of the galactic medium in electro-gravitational and magneto-spin homogeneous fields.

3. DOMAINS OF QUANTUM VACUUM (DARK MATTER) IN ELECTRIC, GRAVITATIONAL, MAGNETIC AND SPIN FIELDS

In the presented model, the quantum vacuum is understood as a heterogeneous medium. One part of such a vacuum consists of a homogeneous, isotropic, polarizing medium infinitely extended in space in the form of dark energy. Another part of the heterogeneous medium of the quantum vacuum, dark matter, is an inhomogeneous polarization medium that forms vacuum domains and the dark halo of galaxies. Nonequilibrium, irreversible processes occurring in a quantum vacuum (dark matter) lead to the formation of stars, quasars, black holes and galaxies in space and the appearance of anomalous phenomena, ball lightning, luminous balls, fire tornadoes and tropical hurricanes. The decisive role in these phenomena is played by the polarization of quantum vacuum and the in homogeneity of dark matter (vacuum domains). In the theories of dielectrics and magnets, i.e. in theories of real polarization media, polarizations characterize the state of the substance itself, and fields are factors in which these states change. Indeed, in dielectrics and magnets, the polarizations are related to the configurations of electric dipoles and magnetic moments, and the fields are related to the forces causing a change in these configurations. Thus, the fields act as a cause, and the polarization - as a consequence of this reason. In this regard, we can say that in these theories of polarizing matter, the polarization-field concept has been established as a set of representations of the interaction of various fields with dielectrics and magnets. Polarizations the quantum vacuum considered above do not fundamentally differ from the polarization of matter. Experiments show that under extreme conditions baryonic matter can turn into the dark matter with the release of energy, and dark matter into baryonic matter (polarization of a quantum vacuum) with energy absorption. From this point of view, quantum vacuum (dark matter), by definition, is in the state of the lowest energy but can accumulate it to a

certain limit. The region of quantum vacuum (dark matter) in which energy is accumulated will be called the domain. It is precisely such formations in the form of moving vortex spinors of dark matter in the form of tangential cylinders whose axes were parallel to the axis of rotation of the Earth that were discovered during experiments with artificial Earth satellites (AES) equipped with magnetometers. The velocity of the satellite relative to dark matter was determined from the change the intensity of the magnetic field. The experiments were conducted in the A.F. Mozhaysky Military-Space Academy in the 90s of the 20th century, under the leadership of the Deputy Head of the Academy for Scientific Work, Professor V.Fateev. Academy staff found that in the areas of tectonic faults, where intense electromagnetic and gravitational interaction of energy occurs between the Earth's liquid magma and cosmic dark matter, toroidal luminous vortices are formed with sizes from microparticles to tens of meters (rotators, spinors, hadrons) [7]. It is interesting that quantum spinors of dark matter in the form of tangential cylinders with axes parallel to the axis of rotation of the Earth are found not only in near-Earth outer space but also in the molten magma of the earth's core [8]. It can be assumed that the described domains of dark matter should be volume resonators and storage of energy. Unfortunately, existing artificial volume resonators cannot store a significant amount of energy for a long time. In the theory of electrogravodynamics, an employee of the Siberian Branch of the Russian Academy of Sciences,

Dr. Vyacheslav Dyatlov, combining Maxwell's electrodynamics and Heaviside's gravodynamics, defines the energy of the quantum vacuum domain (VD) in electric, gravitational, magnetic and spin fields [9]. Dr. Vyacheslav Dyatlov believes that the most important result of solving VD problems in the form of a ball in electro-gravitational and magneto-spin homogeneous fields is the determination of two VD dipoles - electric \mathbf{d} and gravitational \mathbf{d}_G , and two moments of VD - magnetic \mathbf{l}_M and spin \mathbf{l}_S . The determination of the dipoles and moments of the VD (the moments of the VD can also be called magnetic and spin dipoles) allows us to determine the energy of the VD associated with four fields: $\mathbf{E}_0, \mathbf{E}_{0G}, \mathbf{H}_0, \mathbf{H}_{0S}$. The classical calculation of the energy of a solitary dipole in an electric field was performed in the theory of electricity by academician Tamm [10]. Based on this calculation, Dr. Vyacheslav Dyatlov suggests calculating the energy of a vacuum dipole (VD) as a four-dipole in four fields (\mathbf{E} - electric, \mathbf{M} - magnetic, \mathbf{G} - gravitational, \mathbf{S} - spin) in the following form:

$$W = W_E + W_G + W_M + W_S \tag{3}$$

Where

$$\begin{aligned} W_E &= -\mathbf{d}\mathbf{E}_0; & W_G &= -\mathbf{d}_G\mathbf{E}_{0G}; \\ W_M &= -\mu_0\mathbf{l}_M\mathbf{H}_0; & W_S &= -\mu_{0G}\mathbf{l}_S\mathbf{H}_{0S}. \end{aligned}$$

μ_0, μ_{0G} is magnetic and magnetospin permeability

$$\mu_0 = 1.257 \cdot 10^{-6} \text{ m} \cdot \text{kg} \cdot \text{c}^{-2} \cdot \text{A}^{-2}$$

$$\mu_{0G} = 0.9329 \cdot 10^{-26} \text{ m} \cdot \text{kg}^{-1}$$

Generally speaking, the fields $\mathbf{E}_0, \mathbf{E}_{0G}, \mathbf{H}_0, \mathbf{H}_{0S}$ depend on spatial coordinates, but they can be approximately considered constants within the domain. Therefore, the dipole forces acting on the quantum vacuum domain, guided by the work of Academician Tamm [10], can be determined as follows:

$$\mathbf{F}_{DE} = -\nabla W_E; \tag{4}$$

$$\mathbf{F}_{DG} = -\nabla W_G; \tag{5}$$

$$\mathbf{F}_{DM} = -\nabla W_M; \tag{6}$$

$$\mathbf{F}_{DS} = -\nabla W_S; \tag{7}$$

Where

\mathbf{F}_{DE} is force acting on the VD as an electric dipole

\mathbf{F}_{DG} is force acting on the VD as a gravitational dipole;

\mathbf{F}_{DM} is force acting on the VD as a magnetic dipole (magnetic moment);

\mathbf{F}_{DS} is force acting on the VD as a spin dipole (spin moment);

∇ is gradient operator [9].

These forces are involved in the fifth fundamental interaction between quantum vacuum and baryonic matter.

4. NATURE OF TORNADES, TROPICAL HURRICANES AND THE ANOMALOUS PHENOMENA OF THE COLD GLOW OF VACUUM

The traditional mechanics of continuous media, postulating a symmetric stress tensor, is applicable only to processes without internal distribution of moments when the equations of moments are carried out identically. At the same time, in a polarizing medium under the influence of a magnetic field, internal moments. They arise that create tangential stresses with an asymmetric tensor. Consider the Einstein – de Haas experiment, which demonstrates the rotation of a ferromagnet placed in a constant magnetic field. This effect is explained by the fact that the spins of ferromagnets initially oriented arbitrarily, under the influence of a magnetic field, take preferential orientation in the field direction. And if in the initial state, the total moment of the momentum of all spins was zero, then in a magnetic field it acquired some value. By the momentum theorem, this will lead to the rotation of the crystal lattice in the direction opposite to the spins. In addition, the internal moment of the spins causes tangential stress, leading to torsional deformation of the ferromagnet. This experiment clearly shows how microscopic processes studied only by quantum mechanics manifest themselves in macroscopic processes. This situation fundamentally changes the traditional idea of the relationship between the microscopic level, described in terms of particles and the macroscopic level, described in terms of concentrations, densities, and volumes. The Einstein – de Haas effect describes a process in which fluctuations at the beginning were localized in a small part of the system, and then propagated and led to a new macroscopic state. The hypothesis of the existence of an inhomogeneous quantum vacuum (dark matter) in the form of vacuum domains allowed Dr. Vyacheslav Dyatlov to combine his theory of electrogravodynamics with the theory of asymmetric continuum mechanics (Cosserat's continuum) by Professor V. Merkulov and to model anomalous phenomena in the field of observed macroscopic processes in nature such as tornadoes, tropical hurricanes and the anomalous phenomena of the cold glow of vacuum [11]. A tornado originates from a mother cloud which descends down to the Earth in the form of a long trunk, inside which the air makes a rapid rotational movement at a speed sometimes reaching the speed of sound. The average size of the tornado cloud is small: 5-10 km across, 4-5 km high. The distance between the Earth and the lower edge of the cloud is of the order of several hundred meters. In a tornado cloud, as a rule, there is a horizontal vortex cloud with an inclined or vertical column of the tornado itself. The mother cloud, which is a small tropical hurricane, like a real hurricane, has the so-called eye, in which there is dead silence. The inner cavity of the tornado has significantly reduced pressure. Self-luminous formations exist both in a relatively large-sized tornado cloud and in a relatively small tornado funnel. Sometimes slowly moving fire pillars known as the "fire tornado" are formed. It is known that a tornado emits electromagnetic waves both in the light range of electromagnetic waves and in the radio range in the form of the white noise of high intensity. The presence of an electric field in a tornado is evidenced by a large number of ball and linear bolts of lightning accompanying tornadoes. It was found that the trunk of a tornado has a magnetic field corresponding to an electric current of hundreds of amperes. The incredibly intense rotational movement in a tornado can be caused only by a distributed moment of forces. Thus, we see in the phenomenon of tornadoes and tropical hurricanes all physical properties indicating the presence of vacuum domains there. Complete identity is observed in the behavior of vacuum domains in a tornado and the behavior of

ferromagnetic domains in the experiments of Einstein – de Haas in a constant magnetic field. Spin polarization in the Einstein-de Haas effect is the rotation of the volume of the liquid at $dS/dt \neq 0$ where S is the total spin of the extracted volume of the liquid. Similar spin polarization of vacuum domains in an electrified thunderstorm atmosphere can draw huge air masses into a terrible whirlpool of tornadoes and tropical hurricanes.

In the polarization theory of electrogravodynamics, Dr. Vyacheslav Dyatlov described the mechanism of the cold glow of some empty volume of space inherent in many anomalous phenomena. He explains this glow by converting gravitational energy into electromagnetic energy in a quantum vacuum (dark matter). In the work of Dyatlov, it is shown that gravitational energy, according to the usual terminology, "low potential" energy, can be converted into gravispin energy and that in turn into mechanical or electromagnetic, that is, into "high potential" energy [9]. Thus, processes with a decrease in entropy can occur in nature, which does not fit into the modern scientific paradigm, but opens up a wide path for new innovative projects.

5. BALL LIGHTNING

A natural example of the existence of quantum vacuum domains (dark matter) in terrestrial conditions can be ball lightning. Ball lightning is a spherical vacuum cavity resonator with plasma walls. The external atmospheric pressure on the plasma wall is compensated by the internal pressure of the electromagnetic field. Using the Poynting vector $S = E \times H$, Professor F. Shakirzyanov determined the volume density of electromagnetic energy for ball lightning with a volume of 1 liter $w = 50000 \text{ J} \cdot \text{m}^{-3}$ [1]. Ball lightning occurs most often during the discharge of linear lightning. The birth of ball lightning is a consequence of powerful energy processes that lead to the displacement by the electromagnetic field of baryonic particles (ions and electrons of the atmosphere) to a spherical plasma boundary and the formation of a quantum vacuum (dark matter) inside the sphere. This explains the failure in attempts to create artificial ball lightning by pumping energy into ball lightning. Thus, the balance between the external atmospheric pressure and the pressure created inside the ball lightning by the radiation of quantum vacuum (dark matter) is violated. The process of emitting electromagnetic energy in ball lightning is in many ways reminiscent of the powerful radiation that occurs during the Randall Mills reaction from the United States when translating hydrogen to a new, previously unknown, low-energy state. In a device called "SunCell" from at company BrLP, electromagnetic energy concentrated in a powerful pulsed beam of light energy in the range $\lambda d = (20-170) \cdot 10^{-9}$ meters is generated when hydrogen atoms go into a newly discovered state - they turn into a "hydrino" and their electrons go to lower energy levels [12]. BLP is currently testing a device called the SunCell in which hydrogen (from splitting water) and an oxide catalyst are introduced into a spherical carbon reactor along with dual streams of molten silver. An electric current applied to the silver ignites a hydrino-forming plasma reaction. Energy from the reaction is then trapped by the carbon, which acts as a "blackbody radiator." When the carbon heats up to thousands of degrees, it reemits the energy as visible light that is captured by photovoltaic cells, which convert the light to electricity (Figure 1) "This is the end of the age of fire, the internal combustion engine, and centralized power and fuels," Mills says. "Our technology is going to make all other energy technology obsolete. Our concerns about climate change are going to be eliminated."

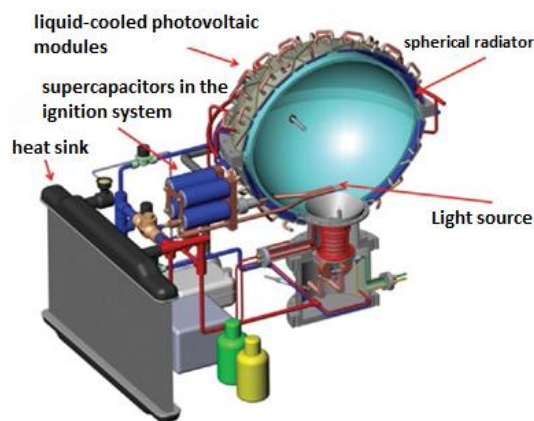


Figure1. SunCell device diagram ("solar cell").

6. STARS ENERGY AND THE FIFTH INTERACTION

The hydrino concept explains how solar disturbances associated with dark matter collect more energy than it can transmit in the form of light. This fact was confirmed in new studies by Professor F. Shakirzyanov, head of the department of the National Research University MPEI. In a detailed examination of the phenomenon associated with solar flares and spots, he came to the conclusion that solar spots and chromospheric flares are regions with photon space of quantum vacuum that are in the process of its transition into the baryonic matter. It becomes clear why thermonuclear reactions occur on relatively cold stars and why the fusion reaction that has begun does not cover the entire star, but proceeds in local regions. Based on photon space of quantum vacuum, Professor F. Shakirzyanov proposed a mechanism for the evolution of stars. A star can transform a certain amount of dark matter into an electromagnetic phase and explode, repeatedly increasing its luminosity for a short time, which happens to supernovae [1]. The locality of stellar matter heating and the locality of the thermonuclear reaction zones explains the long life of stars. Another professor at the Pulkovo

Observatory Nikolai Kozyrev noted: “It is interesting that even such a specific question is why the Sun and stars are shining, i.e. why they are in thermal equilibrium with the space surrounding them cannot be solved within the framework of known physical laws. This conclusion follows from the analysis of astronomical data. The fact is that individual celestial bodies and their systems are so isolated from each other that thermal death for them must be noticeably closer before the intervention of an external system occurs. Therefore, degraded states of systems should prevail, and at the same time, they almost never occur. The task is to understand why individual systems and celestial bodies themselves continue to live, despite the short periods of relaxation.” [13]. The answer may be the presence of a fifth interaction associated with dark matter (quantum vacuum).

7. CONCLUSION

The creation of the theory of quantum electrodynamics of giant energies, many times higher than the energy density in natural fuels, fissile materials and raw materials for thermonuclear fusion, lies in the way of studying and converting quantum vacuum (dark matter) into the baryonic matter and in the fifth interaction. The results of the study can be used to create powerful energy installations on Earth and in space. The hypothesis of the existence of an inhomogeneous quantum vacuum (dark matter) in the form of vacuum domains, which are volume resonators of electromagnetic, gravitational and spin energy, allows us to scientifically explain the anomalous cold glow of empty space, the mechanism of tornadoes and tropical hurricanes, ball lightning and the evolution of supernovae and black holes.

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