Understanding Anomalies to Extract Vacuum Energy

P.A. Murad

Vienna, Virginia USA, Ufoguy11@AOL.com

Abstract. Recent Russian literature contains some interesting speculations of potentially wide applicability regarding the physical vacuum. These investigations examined and applied a theory to various anomalies to try and understand what these events may represent. Data were collected by Dmitriev to quantify these events and identify commonalties that indicate the anomalies might have a natural origin. Dyatlov created theories on the Polarized Inhomogeneous Physical Vacuum where he claimed that each anomaly possessed a distinct boundary separate from its surroundings. Within this inhomogeneous boundary, the theory suggests that the magnetic, electric, gravitic, and spin fields would be different from its surroundings. From these findings, he developed equations that resemble the London equations for a superconductor and are somewhat similar to those developed later by Puthoff. The importance of these events is that with additional understanding, they may offer a means for extracting energy from the physical vacuum. Moreover, one may speculate that these anomalies may represent a gravitational vortex or even a portal or a wormhole to look into potential travel within other dimensions.

INTRODUCTION

The conventional wisdom can explain events using known knowledge that consists of well-behaved and understood data points whereas those that do not fit a commonly accepted model are rejected, discarded or viewed as invalid. However, these latter data points may be equally valid. It is these events that we will examine that may provide some new insights and expand the boundary of what we commonly call conventional wisdom.

Dyatlov of Novosibirsk was interested in examining 'true' anomalies. He used efforts by his colleagues Merkulov who focused more on the alien spacecraft hypothesis and Dmitriev that looked at more expected natural explanations. Dmitriev (1998) has published an extensive body of literature on ball-lightning and his experimental investigations go back to the mid sixties. Some of Dmitriev's investigations (1992, 1995) include a statistical representation of ball lightning. His findings suggest that in the Novosibirsk region alone, over 80% of ball lightning sightings occurred in urban areas during lightning storms. One reason may be that Russian electric systems use 230 volts and power lines are ungrounded. During such storms, ball lightning literally jumps out of electric sockets. Most worldwide data stress that ball lightning occurrences usually occurs at night during storms. In contrast to other worldwide data, Japanese data indicate that ball lightning can occur during calm days in the afternoon separate from erratic weather conditions. These scientists put together a theory regarding events as they affect weather. Merkulov (1998) believed ball lightning was created by the sun and sent outward. When these balls enter the Earth's atmosphere, they entrain air and rotate as they descend into the atmosphere, they lengthen into filaments that fall in a horizontal fashion. If they rotate and touch the ground, they can become tornadoes. Interestingly, private conversations with U.S. scientists indicate multiple ball lightning has been observed within or traveling with tornadoes. Dmitriev and Dyatlov go further to suggest that these events occur at locations on the Earth's surface where tectonic plates intersect. In fact a majority of the unusual events they observed were located at such sites. This paper will present some of the anomalies that Dyatlov investigated.

In a speculative paper by the author and R. M. L. Baker, Jr. (Baker, 2003), possible travel into other dimensions was examined. The lack of solid theories to explore this potential is not available because of the lack of data that could relate the past, present and future to one specific time or location. The only example may be Kosyrev's telescope experiment (Korotaev, 2000; Kosyrev, 1968) where he detected energy from a spinning star at various locations that represented its past, present and future location. This experiment was repeated a decade later with similar results. In this paper, we suggest that the space-time boundaries of several different realities could intersect and such intersections may allow for inter-dimensional travel. Moreover, due to its effect on space-time, gravity may be multi-dimensional (up to 5 different dimensions) and may act as a portal to the manifold connecting different sequences of realities. What is suggested here is that these inhomogeneous physical vacuum

regions investigated by Dyatlov may potentially lead to such a portal as well as open the door to understanding how to possibly extract energy from the physical vacuum.

DISCUSSION

Sakharov provided a theory that energy may be extracted from the vacuum. The West thought more along the lines of Dirac (Rueda, 1999; Puthoff, 1998; Haisch, 1998) and proceeded to develop the Zero Point Field where particles are instantaneously created and annihilated simultaneously with their electric, magnetic and gravitic fields. Energy may be extracted when these fields are either created or destroyed. In contrast, the Russians coined the phrase Physical Vacuum. The physical vacuum (Shipov, 1993; Dyatlov, 1989,1995, 1998) that represents a state defined by spinors that contain electric, magnetic, gravitic, and a spin field. To be consistent with Einstein's theory of relativity, electric, magnetic, and gravitic fields are limited to the speed of light for field propagation speeds. By contrast, the propagation velocity of the spin field is considerably higher. Shipov provides the groundwork for most of the Russian perspective. However, he considers the physical vacuum as a homogeneous continuum and the flaw is that his theory is unsuitable for explaining anomalies. By contrast, Dyatlov was searching for answers regarding UFOs as "Anomalistic Observational Phenomena" (AOPs), and even poltergeists, not as alien events but as truly natural phenomenon. Dyatlov implies that the glow in a specific region of an anomalous phenomenon may be conversion of electromagnetic fields into a gravitational field or vice versa. He derives similar equations as the London equations for a polarized physical vacuum that are only applicable in a very restrictive geometry defined by the boundaries of the anomalous event, which he uniquely calls a polarized inhomogeneous physical vacuum. The glowing phenomenon is also reported in some Russian gravitational experiments to include Godin et al (2001). Dyatlov considers that a homogeneous physical vacuum exists but that the anomaly is within separate boundaries as an inhomogeneous region. Here, the electric, magnetic, gravitic, and spin fields differ from their surroundings and there are discontinuous boundary conditions, which must be satisfied in going from one region to another.

Observational Data and Some Interpretations

It is believed that phenomena in the inhomogeneous physical vacuum are connected with anomalous phenomena in the Earth's atmosphere, such as shown in Fig. 1 from Dmitriev (1998). Such phenomena exhibit a polarized nature. Here a subset of atmospheric phenomena was considered that included ball lightning (BL) and naturally occurring tornadoes. In spite of their accidental character and appearance, one can obtain a better-defined physical portrait of these anomalous phenomena. Self-luminous bodies are observed in both of these events: in BL it appears in the form of a ball; in a tornado – in the form of an elongated taper. On closer analysis of the literature, the self-luminous bodies of BL and tornados can radiate not only at visible frequencies but also as electromagnetic waves in a considerably wider wavelength spectrum. There are subsequent changes within the Earth's electrical and magnetic fields in the immediate vicinity of such self-luminous bodies. The BL and tornado phenomena involve rotation of gas within a self-luminous body. In BL, the self-luminous body displays intermittent change of its flight dynamic trajectory. Intermittent motion is also characteristic for a tornado column as they usually move along a 'dotted line'; touching the ground and then lift up, only to repeat this cycle. The connection between BL and a tornado emphasizes that a tornado can be accompanied by a 'bevy of BL's'. Moreover, data supports the conclusion that both BL and tornado occurrences usually increase during the active years of the Sun-spot cycle. There is a distinction in sizes of self-luminous bodies in tornadoes or BL. The large size of the tornado column seems to also allow a physical change in the gravitational field: levitation. As noted by V. Merkulov (1998), a tornado column carries away large amounts of loose material without scattering it. Such properties may take place due to a dipole distortion in the gravitational field within the tornado's column. By contrast, because of its relatively small size (20-30 cm in diameter), it is difficult to notice levitation in BL, except by implication. Dust, and small items, may be captured inside the self-luminous BL.

Within the conventional wisdom, it is quite difficult, to visualize some physical object with a set of physical properties comparable to either BL or a tornado. Similarly within modern gravitational theories (Einstein and Heaviside), we cannot obtain a local distortion of the Earth's gravitational field. Electric fields, and especially magnetic fields, emerge as if from a void. To artificially create these fields, one would require cumbersome electrical and mechanical devices. It is also impossible to imagine that the self-luminescence of BL is caused by substantial plasma. Moreover, BL and similar objects are observed (Dmitriev, 1998) and appears in the vacuum of the cosmos, in the Earth's atmosphere, and even in water and in solid bodies. When a tornado touches the ground, an intensive rotation of gas occurs within the column attributable to a distributed moment of momentum

of considerable magnitude inside of the tornado. Conventional wisdom is unable to suggest the nature that causes such a moment.


FIGURE 1. A Medium Scale Self-Luminescent Body in a Thunder-Prone Zone in the Central Part of the Southern Urals.

FIGURE 1. Represents a type of specific region or physical vacuum with respect to Dyatlov's theory. These regions may also include such things as anti-matter as an example. These phenomenons have properties concerning 'light' and may reveal a transitional geophysical reality as an energy manifestation or, under special conditions, ether materiality. This could represent a splitting of spatial properties where this 'space' has background properties that are altered and conditions fill a three-dimensional space with ether material.

Consequently, Dyatlov claims it may make sense of speaking about switching our world with another world of ether reality. The short duration of these events may also support such an interpretation.


FIGURE 2. An Event in the Ural Mountains
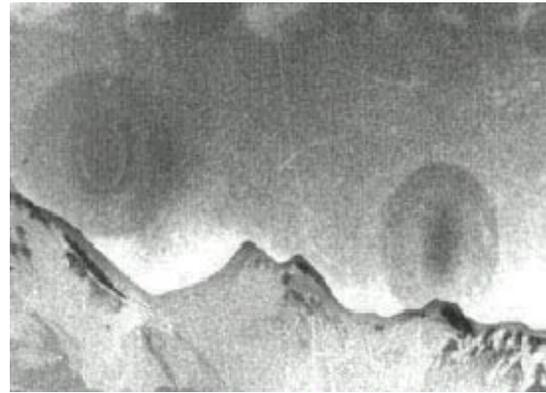
FIGURE 3. A Second Event in the Ural Mountains

FIGURE 2 is from the Katun ravine in the direction of the Belukh mountain summit complex taken on August 16, 1974 from a helicopter at about 14:00 hours local time. Observers noted a strange darkening in the area of Belukh Mountain. (Photograph by V. Semeshin using a "Kiev" camera with a 1/250 exposure). Figure 3 shows a large-scale event above the Katun's mountain ridge seen from a helicopter on Aug.19, 1972 at 11:40 local time.
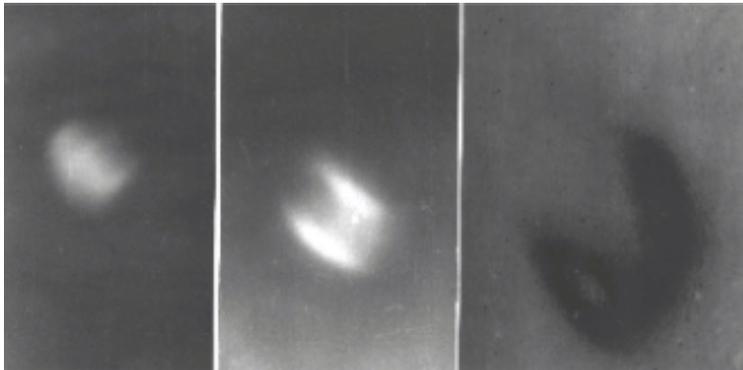
FIGURE 4. These photographs show the different stages of a luminescent object similar to but unlike ball lightning.

"Whitish shining spots in the direction of Mt. Belukha summits" drew the observers' attention. The disk and oval shapes, distinctly visible in the photo, were not visually observed. An estimate of the objects using the topographic charts of the region gives more than 1.5 km in diameter. (Photo of A.V. Semeshin). If FIGURE 2 may be characterized as a lens reflection internal to the camera, then what could be said about FIGURE 3? A lens

reflection should result in a singular object assuming there were no further internal reflections within the camera. Moreover, if internal reflections did occur, they should somewhat resemble each other, which is not the case. The quality of the 'activity spots' is variable and the power of the effect on geophysical fields is also variable in terms of magnetic, electric, thermal and gravitational fields. This figure shows how similar objects previously shown may undergo a change as a function of time in terms of luminosity and, eventually their shape. How does one bound this problem regarding such anomalies let alone find ways to resolve some of these issues either qualitatively or quantitatively?

In all of these figures, it is possible that these are large zones of vertical energy transfer that occur over large intervals of time. Zones of anomalous behavior of electric and magnetic fields can become dangerous especially during the period of geological reordering, which began with the earth's space interaction and geomagnetic pole reversal. The change of the overall structure of the electromagnetic frame of the earth unavoidably stimulates powerful physical anomalies of tectonic physically stressed zones including gravimetric and electrogravitational transformations of the geological medium.

FIGURE 5. A large scale "Gray Spot" near the western peak of the city Beluka of Gornyy Altay shows some details that differ from the circular patterns of the previous figures.

FIGURE 6. This event occurred in the Ural Mountains.

The manifestation near geological-geophysical medium does not remain 'traceless' because a number of events reveal features that may involve a unique energy mechanism. For example, absorption of cloud cover may alter the electrical conductivity of the atmosphere, which could be disturbed for tens of square miles forming an electrical lens in the atmosphere. There may be other explanations of this data; however, as one can see the details are difficult to explain. In previous efforts published by Murad (1999), the notion was raised that Maxwell's as well as the equations for gravity and cogravity have a Laplacian term embedded in the electric and magnetic fields that allows for the existence of irrotational phenomenon.

This may include solenoidal fields representing electric, magnetic or gravitational vortices. These figures, without more available information, may fall into these categories warranting further explanation.

If one lived in the Yukon, FIGURE 6 would be viewed as a phenomenon known as a 'Snow Devil' usually seen only in the northern most latitudes. This picture, however, is looking south toward the equator and is in the Ural Mountain region.

Based upon these figures, it is clear that something very unusual is occurring in this region. Moreover, since mountains are made where tectonic plates crumble, push up or down, or form creases within the plate, the local electric, magnetic, and gravitic fields undergo some level of distortion which could result in creating these phenomenon according to Dyatlov and Dmitriev. Moreover, these events tend to imply a large release of energy, electricity, magnetism, and possible changes in the local gravitation field.

Dyatlov's Theoretical Explanations

The polarization model of the inhomogeneous vacuum implies that these anomalies may be an irradiation, in that it gives a qualitative explanation for a whole spectrum of macroscopic properties of anomalous phenomena. On the contrary, there is a coincidence of physical properties to objects of the classical theory of polarized inhomogeneous mediums, with the properties of vacuum domains of anomalous phenomena. This is the most striking evidence in favor of the polarized physical vacuum with simultaneous electrical, magnetic, gravitational and spin medium. Dyatlov (1998) presents a polarization model of the inhomogeneous physical vacuum to discuss the above theories of physical vacuum (vacuum as a polarized medium (Akimov, 1992)). Moreover, the physical properties of BL and tornadoes are used to substantiate these concepts. These requirements are:

- The model unifies electrodynamics and gravidynamics, which are understood as material - vacuum polarization theories,
- The model contains a physical description of a self-luminous body such as ball lightning, tornadoes, and other anomalous phenomena that are understood as some formation of a polarized vacuum, and
- The model does not conflict with commonly accepted space-time notions outside of the self-luminous body.

The term polarization is used in the classical sense and represents a vector sum of elementary dipoles (not particles) and moments in the unit volume of a vacuum. These items would otherwise be considered as vector densities of elementary dipoles or moments.

Physical Vacuum as a Polarized Electromagnetic Medium: Maxwell's Equations- Maxwell's equations describe a physical vacuum as a polarized electromagnetic medium. These equations are:

$$\nabla \cdot \mathbf{D} = \rho, \ v_0 \nabla \times \mathbf{E} = -\partial \mathbf{B}'/\partial t,$$
$$\nabla \cdot \mathbf{B}' = 0, \ v_0 \nabla \times \mathbf{H}' = \mathbf{J} + \partial \mathbf{D}/\partial t. \tag{1}$$

Here:

$$\mathbf{D} = \mathbf{P}_{0E} + \mathbf{P},$$
$$\mathbf{B}' = \mathbf{P}_{0M} + \mathbf{M}. \tag{2}$$

The quantity $\mathbf{B}'$ is the induction; $\rho, \mathbf{J}$ are densities of electrical charges and currents; $\mathbf{P}, \mathbf{M}$ are electrical and magnetic polarizations of the material respectively; $\mathbf{P}_{0E}, \mathbf{P}_{0M}$ are the electrical and magnetic polarizations of the physical vacuum. From (2) it follows that inductions are the sums of polarizations of the physical vacuum and material. The vectors $\mathbf{E}, \mathbf{H}'$ remain as fields. Thus the vectors $\mathbf{D}, \mathbf{B}'$ and $\mathbf{E}, \mathbf{H}'$ have a completely different physical meaning. If we put $\mathbf{P}_{0E} = \varepsilon_0 \mathbf{E}$, and $\mathbf{P}_{0M} = v_0 \mathbf{H}'$, and we return to μ_0, $\mathbf{H}, \mathbf{B}$ in Eqs. (1,2), then we obtain a standard form of Maxwell's equations in MKSA units. In spite of requiring $\mathbf{B} = \mu_0 \mathbf{H} + \mu_0 \mathbf{M}$, the standard form of Maxwell's equations already reflects the physical vacuum as a polarized medium that provides the true physical essence of these equations. According to Dyatlov, this represented a system with polarized inductions and fields.

Physical Vacuum as a Polarized Gravispin Medium: Heaviside's Equations- Heaviside's equations describe the physical vacuum as a gravispin-polarized medium by the following equations:

$$\nabla \cdot \mathbf{D}_G = -\rho_G, \ v_{0S} \nabla \times \mathbf{E}_G = -\partial \mathbf{B}'_S/\partial t,$$
$$\nabla \cdot \mathbf{B}'_S = 0, \ v_{0S} \nabla \times \mathbf{H}'_S = -\mathbf{J}_G + \partial \mathbf{D}_G/\partial t. \tag{3}$$

Where $\mathbf{E}_G, \mathbf{H}'_S$ are gravitation and spin fields respectively; $\mathbf{D}_G, \mathbf{B}'_S$ are gravitational and spin inductions; $\rho_G, \mathbf{J}_G$ are the densities of masses and gravitational currents;

$$\mathbf{D}_G = \mathbf{P}_{0G} + \mathbf{P}_G, \ \mathbf{B}'_S = \mathbf{P}_{0S} + \mathbf{P}_S. \tag{4}$$

The variables $\mathbf{P}_G, \mathbf{P}_S$ are, respectively, the gravitation and spin polarization of the physical vacuum; c is the speed of light. According to (4), Heaviside's equations as well as Maxwell's equations treat inductions as the sums of polarizations. For gravidynamics, the inductions have the physical property of polarization. The polarizations of material $\mathbf{P}_G$ and $\mathbf{P}_S$ are negligibly small. If $\mathbf{P}_{0G} = \varepsilon_{0G} \mathbf{E}_G$, then the Heaviside equations are in a familiar form seen in the literature (Heaviside, 1883; Jefimenko, 1991).

Absolute Physical Vacuum- In both Maxwell's equations (1, 2) and in the Heaviside equations (3, 4), the four polarizations $\mathbf{P}_{0E}, \mathbf{P}_{0M}, \mathbf{P}_{0G}, \mathbf{P}_{0S}$ characterize the physical vacuum as a polarized medium. In these equations different kinds of material characterize the densities of charges ρ, ρ_G, currents $\mathbf{J}, \mathbf{J}_G$ and four substantial polarizations $\mathbf{P}, \mathbf{M}, \mathbf{P}_G, \mathbf{P}_S$. The absence of material (substance) sets the equality to zero for all substantial charges, currents, and polarizations and Maxwell's equations

and those of Heaviside are called 'vacuum equations'. Thus, Eqs. (1-4) allows one to consider the different polarized vacuums. Let:

$$\mathbf{P}_{0E} = \varepsilon_0 \mathbf{E}, \ \mathbf{P}_{0M} = \nu_0 \mathbf{H}', \ \mathbf{P}_{0G} = \varepsilon_{0G} \mathbf{E}'_G, \ \mathbf{P}_{0S} = \nu_{0S} \mathbf{H}'_S. \tag{5}$$

We obtain the physical vacuum that for a long time was called and understood as 'a void'. This vacuum, according to Shipov, can be called the absolute physical vacuum (APV).

Two vacuum polarized mediums compose APV: electromagnetic and gravispin. Such mediums assume that elementary particles of physical vacuum, which Akimov & Tarasenko (1993) call 'fitons', fall within a square display, which Dyatlov calls 'quadrigue'. This quadrigue is shown in Fig. 7,

1	2
$+m, +q, +s, +\mu$	$+m, -q, +s, -\mu$
3	4
$-m, -q, -s, -\mu$	$-m, +q, -s, +\mu$

FIGURE 7. Dyatlov's quadrigue of particles. m = mass; q = electrical charge; s = spin; μ = magnetic moment.

The fiton represents a particle that has mass, electric, magnetic, and spin fields. The APV is 'globally' neutral (Dyatlov, 1993), and it easily explains why in APV electromagnetic and gravispin physical properties appear to be absolutely unrelated. From Fig. 7 it is seen that Dyatlov's quadrigue is defined for the fiton as some peculiar quadripole where a pushing apart, for example, of positive and negative masses leads to the creation of a gravitational dipole but doesn't lead to the creation of other dipoles, and so on. The Eqs. (1, 2) of Maxwell and (3, 4) of Heaviside for the APV are Lorentz covariant and compatible with Minkowski mechanics and special relativity theory.

Physical Vacuums of Matter and Antimatter- A number of physical phenomena are explained by the conventional wisdom assuming there is no connection between electrodynamics and the theory of gravity. This assumption uses classical electrodynamics and quantum electrodynamics. Such facts obviously correspond to situations when a vacuum medium represents an APV. However, modern physics keeps us from advocating that all space within the Universe is filled with APV, whereas a large number of inexplicable anomalous phenomena exists. One possibility is to find approaches to explain such phenomena in connection with a search for physical vacuums other than APV. For vacuums different from the APV, Shipov implies that global neutrality exists within the physical vacuum and sums of electrical charges, magnetic moments, masses and spins in every physical point of the unexcited vacuum is equal to zero. According to this principle, one may see that beside APV, two more physical vacuums exist as shown in Fig. 8.

PMV	APV		PVA
$+m, +q,$ $+s, +\mu$	$+m, +q,$ $+s, +\mu$	$+m, -q,$ $+s, -\mu$	$+m, -q,$ $+s, -\mu$
$-m, -q,$ $-s, -\mu$	$-m, -q,$ $-s, -\mu$	$-m, +q,$ $-s, +\mu$	$-m, +q,$ $-s, +\mu$

FIGURE 8. The division of Dyatlov's quadrigue into two dyads PVM and PVA.

The first of these vacuums is called a physical vacuum of matter (PVM), where a particle $+m, +q, +s, +\mu$ enters into it's dyad. The second vacuum is called a physical vacuum of antimatter (PVA), whereas an antiparticle $+m, -q, +s, -\mu$ enters in it's dyad (matter possesses a positive mass. Thus, particles and antiparticles belong to matter; material is everything: matter, negative mass, and fields). Figure 3 shows that PVM and PVA create bound dipoles and moments. Electrical and gravitational dipoles, magnetic and spin moments coincide in the

direction within PVM. In PVA electrical and gravitational dipoles, magnetic and spin moments are just the opposite. An electrogravitational and magnetospin connection exists in PVM and PVA that may be expressed as follows:

$$\mathbf{P}_{0E} = \varepsilon\varepsilon_0\mathbf{E} \pm \varepsilon_1\mathbf{E}_G, \ \ \mathbf{P}_{0M} = \nu\nu_0\mathbf{H}' \pm \nu_1\mathbf{H}'_S,$$
$$\mathbf{P}_{0G} = \varepsilon_G\varepsilon_{0G}\mathbf{E}'_G \pm \varepsilon_1\mathbf{E}, \ \ \mathbf{P}_{0S} = \nu_S\nu_{0S}\mathbf{H}'_S \pm \nu_1\mathbf{H}'. \tag{6}$$

Where: $\varepsilon, \nu \equiv \mu, \varepsilon_G, \nu_G$ are relative electrical, magnetic, gravitational and spin permeability of PVM and PVA material; ε_1, ν_1 are coefficients of an electrogravitational and magnetospin bound media; a plus sign relates to PVM; a minus sign relates to PVA. Obviously expressions for the vacuum polarizations (6) at $\varepsilon_l \neq 1$ and $\nu_1 \neq 0$ link the equations of both Maxwell (1,2) and Heaviside (3,4) in a system of linear differential quadratic equations. In this algebraic system, parameters such as $\varepsilon_0, \nu_0, \varepsilon_{0G}, \nu_{0S}$ have certain numerical values and parameters $\varepsilon_1 ; \nu_1 ; \varepsilon; \nu; \varepsilon_G; \nu_S$ are free and are determined by the physical properties of observable anomalous phenomena. It is accepted that $\varepsilon = 1$, $\nu = 1$, $\varepsilon_G = 1$, $\nu_S = 1$;

$$\alpha_\varepsilon = \varepsilon_1 / \sqrt{\varepsilon_0\varepsilon_{0G}}; \alpha_\nu = \alpha_\mu = \nu_1 / \sqrt{\nu_0\nu_{0S}} = \mu_1 / \sqrt{\mu_0\mu_{0G}} \ . \tag{7}$$

Thus the physical properties of PVM and PVA matter are seen within the Eqs. (1-4, 6), which may be called the equations of combined *electrogravidynamics*.

Polarization Model for an Inhomogeneous Vacuum: Vacuum Domains- The space regions of self-luminous bodies and other anomalous phenomena are filled with PVM and PVA or mixtures of PVM and APV, PVA and APV. These different mixtures are described with equations (1-4, 6) by decreasing numerical values of the coefficients of the electrogravitational connection coefficient ε_1 and the magnetospin connection coefficient ν_1. Regions outside of the self-luminous bodies are assumed filled with APV. Thus, there arises a polarization model for the inhomogeneous physical vacuum, where properties of anomalous phenomena are revealed as a solution to boundary-value problems of mathematical physics. Here we always assume that there is a body having a definite form and size. A medium inside the body is described by the equations (1-4, 6), whereas the medium outside this body – with equations (1-4, 5). We formulate boundary conditions similar to the boundary conditions in an analogous problem of electrodynamics. Assuming that the surface currents and charges are absent at the boundary of a body from equations (1-4) themselves, it is necessary to set normal projections of inductions and tangential projections of the field to be equal inside and outside the body along the boundary surface. The model of the inhomogeneous vacuum shows a possibility for vacuum objects having all the properties of BL and tornadoes can exist without being clearly defined as 'self-luminous'. Here, "self-luminous bodies" will be called vacuum domains. Zeldovich and Kosyrev (Zeldovich, 1974) developed the physical concept of a vacuum domain from the Big Bang theory. This concept, however, only relates to the forces within the nucleus, and not to macroscopic electromagnetic and gravitational fields. At the same time, a term within the definition of the vacuum domain is also appropriate in the model on the basis of classical polarization theory.

Dyatlov claims that a remarkable peculiarity of these problems in electrogravidynamics is that the solutions may reflect simultaneously passing through a number of physical processes. However, all these processes develop as an inverse problem when external fields are defined. If we set all sources (charges, masses, and currents) equal to zero, then we obtain a homogeneous system of equations that give solutions to the external fields that are equal to zero. In all of these problems, the vacuum domain plays a role to transform the electromagnetic field energy into gravispin field energy and vice versa.

CONCLUSIONS

Dyatlov's theory requires a solid experimental foundation. At present, there are specific directions for the continued development of this work to develop:

- A macroscopic theory of vacuum domains based on Maxwell's electrodynamics, Heaviside's gravidynamics and the classical theory of polarized inhomogeneous mediums to describe the macroscopic processes of anomalous phenomena,
- A microscopic quantum theory of vacuum domains, considering the theory of high energy elementary particles to describe the birth and annihilation of vacuum domains, and
- An experimental study using vacuum domains considering macroscopic and microscopic theories.

The microscopic theory of vacuum domains has not made its first steps. However, the polarization model of the inhomogeneous physical vacuum has already applied certain restrictions on a future microscopic theory. The

Heaviside equations are similar to Maxwell's equations, when secondary quantized, they give the value of 1 to the spin of a graviton which is also equal to the spin value for a photon. At the same time, it follows from the GTR of Einstein that a spin of a graviton should be equal to 2. Thus Heaviside gravidynamics, followed by the polarization model of the inhomogeneous physical vacuum, comes into conflict with Einstein's GTR. Only by experiment can one solve the discrepancy on the spin for a graviton. According to Dyatlov: *"As long as such experiments are not performed, we can not consider Einstein's GTR to be the last word of truth."*

ACKNOWLEDGMENTS

REFERENCES

Akimov, A. Ye. and Tarasenko, V. Ya., Models of polarization states of the physical vacuum and torsion fields. *Izd. vuzov. Fizika*, 1992, No. 3, pp. 13-23. (in Russian).

Baker, jr., R. M. L., Murad, P. A., "Cosmology and the Door to Other Dimensions and Universes," Paper No. AIAA 2003-4882, presented at the 39th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Huntsville, Ala., July 2003.

Dmitriev, A. N., Poholkov, Ju P., Protasevic, E. T. , Scavinsky, V. P.: "Plasma Generation in Energy-Active Zones," *Novosibirsk, Rus. Acad. Sci. Sib. Branch Geol. Geophysics Inst.* 1992, 212pp.

Dmitriev, A. N., Dyatlov, V. L., "Nonhomogeneous Physical Vacuum Model and Natural Self Luminous Objects," 1995, 31 pp.

Dmitriev, A. N.: *Natural Self-Luminous Formations.* Novosibirsk: Pub. Inst. of Mathematics, 1998, - 191 pp. (in Russian).

Dyatlov, V. L., Dmitriev, A. N. and Merkulov V. I., Private communications and V. I. Merkulov: *Known and Unknown Hydrodynamics*, Nauka, Moscow 1989.

Dyatlov, V. L., "Electrogravimetric Energy Transformation, Moscow," NT-Center, 1995, 29 pp.

Dyatlov, V. L., *Polarization Model of the Inhomogeneous Physical Vacuum*, Novosibirsk Institute of Mathematics Publishing House, 1998 (in English).

Dyatlov V. L., *Polarization model of non-homogeneous physical vacuum.*- Novosibirsk: Pub. Inst. of Mathematics, 1998, 184 pp. (in Russian).

Godin, S. and Roschin, V., *"An Experimental Investigation of the Physical Effects in a Dynamic Magnetic System"*, Paper No. AIAA 2001-3660, 2001 Joint Propulsion Conference.

Haisch, B., Rueda, A., Puthoff, H. E., "Advances in the Proposed Electromagnetic Zero-Point Field Theory of Inertia," AIAA 98-3143, at the 34th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, July 13-15, 1998, Cleveland, Ohio.

Heaviside, O. A. Gravitational and Electromagnetic Analogy. *The Electrician*, 1883, pp. 282-282, 359.

Jefimenko, O. D., *Causality, Electromagnetic Induction and Gravitation.* Star City: Electret Scientific Co., 1991, 180 pp.

Korotaev, S. M., Serdyuk, V. O., Sorokin, M. O. ,"Experimental Verification of Kosyrev's Interaction of Natural Processes," Galilean Electrodynamics & GED East, Volume 11, Special Issues 2, Fall 2000, pp.23-28.

Kosyrev, N. A. ,"Possibility of Experimental Study of the Properties of Time," JPRS: 45238, 2 May 1968.

Merkulov, V. I., *Electrogravidynamic Model of the UFO, Tornado and Tropical Hurricane.* Novosibirsk: Pub. Inst. of Mathematics, 1998,- 71 pp. (in Russian).

Murad, P. A., "Hyper-light Dynamics and the Effects of Relativity, Gravity, Electricity and Magnetism," IAF Paper No. 99-S.6.02 presented at the 50th International Astronautical Congress in Amsterdam, the Netherlands, Oct 4-8, 1999.

Puthoff, H. E., "Can The Vacuum Be Engineered for Spaceflight Applications? Overview of Theory and Experiments," *Journal of Scientific Exploration*, vol. 12 No. 1, pp. 295-302, 1998.

Rueda, A., Haisch, B. and Sunahata, H., Electromagnetic Zero Point Field As Active Energy Source in the Intergalactic Medium," AIAA Paper No. 99-2145, at the 35th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, 20-24 June 1999, L.A., California.

Shipov, G. I., **Theory of Physical Vacuum** (Moscow, ST-Center, 1993, 353 pp. *Theory of physical vacuum. Theory, experiments and technologies.* Second pub.-Moscow: Nauka, 1996, 450 pp. (in Russian).

Zeldovich, Ya. B., Kosyrev, I. Yu and Okun, L. B., *Cosmological consequences of spontaneous violation of discrete symmetry.* ZhETF, V.67, No. 1 (7), 1974, pp. 3-11. (in Russian).