SHIPOV'S VACUUM EQUATIONS AND A NEW SCIENTIFIC PARADIGM

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Abstract

Shipov proposed a new Scientific Program on Universal Relativity, which lead to a discovery of Equations of Physical Vacuum that describe both Material World and the World of Highest Reality. Shipov's unique attempt created a New Scientific Paradigm that changed the old materialistic approach to the interpretations of World's Structure and Forces of Nature.

The new scientific vision is close to the Oriental Philosophy that describes the World as consisting of material elements in their entanglements that are registered and evaluated by Consciousness, i.e. comprising the World of Highest Reality as a Priority Level.

Key words:

World of Highest Reality, New Scientific Paradigm, Shipov's Vacuum Equations, Torsion Fields, orientable point.

The history of Shipov's Vacuum Equations begins from Shipov's geometrization of classic Maxwell-Lorentz' electrodynamics equations. The difficulties of this theory and electrodynamics equations are well-known and even quantum electrodynamics could not resolve those solutions. While developing the quantum theory at the beginning of the last century, the physicists were perplexed by two questions:

1) Why the electron doesn't radiate EM during its accelerated motion around the nucleus?
2) Why the magnetic moment does not change during electron's rotation?

Neither Standard model, nor String theory could provide the answers to these questions.

N. Bohr attempted to postulate the existence of atomic stationary orbits. His statement still could not explain the physical situation and just offered us to accept the phenomenon as a fact. Therefore, the common answer, that this is a property of quantum systems, is indirectly based upon Bohr's postulate.

In order to overcome this difficulty in 1972 G. Shipov [1] proposed to view the electron motion in atom according to geodesic equations of the curved parametric Riemannian space created by nucleus. Locally the space-time of such electrodynamics appears to be flat, that is why the electron does not radiate both locally and globally along all the trajectory of a charge inside an atom. Shipov's Vacuum Equations of the geometrized electrodynamics resemble Einstein's vacuum equations $R_{ik}=0$, which Einstein considered to be the only true equations of gravitational field [2]. The solution of the geometrized vacuum equations for the spherical-symmetric field of the nucleus allows obtaining the metrics of the space of events similar to Schwarzschild's metrics. While moving along Schwarzschild's geodesics the electron moves with acceleration in these metrics, but it conserves total (kinetic + potential) energy, thus without EM radiation. That is why in geometrized electrodynamics there is no need to introduce the Bohr postulate. According to G. Shipov, his work [1] for the first time introduces the principle solution for the first Einstein's scientific problem – geometrization of the classical electrodynamics equations [3]. However such

electrodynamics does not explain the discrete nature of electron orbits in atoms as well as stability of the electron magnetic moment.

While as in 1968-1972 G. Shipov worked over the creation of geometrized electrodynamics, he attended theoretical seminars supervised by D.D. Ivanenko, where they discussed E. Cartan's ideas. In one of his 1922 works E. Cartan stated that the rotation of matter should create torsion of space of events. Influenced by those debates in 1976 Shipov wrote an article [4] using 10-dimentional space of events of the orientable points (point with its own rotation – spin), where the rotation is connected with the torsion of space of absolute parallelism. That allowed him to geometrize the right hand side of Einstein's equations (material fields), when torsion of the absolute parallelism completely defines the structure of matter. As we know the energy-momentum tensor in Einstein's equation usually is introduced manually and have got phenomenological structure. Thus in 1976 G. Shipov considers that in his works [4, 5] he found the principle solution for the Einstein's second scientific problem – geometrization of the material field [6], while he interprets material torsion field as the field of inertia, caused by local rotation of matter as viewed by E. Cartan. The problem of inertia is known as an oldest problem in physics since Newton's times. Following E Mach, A. Einstein assumed that the inertial forces are caused by the remote masses in the Universe (global approach), which could not follow from his gravitational equations anyway. On the contrary, Shipov in his work [5] has shown us that inertial fields, causing inertia forces, have got local nature and are created by rotation of matter (Cartan's hypothesis).

Since contemporary physics views material fields as quantum fields only, G. Shipov in his work [7] in 1977, noted by the International Committee on General Relativity Theory and Gravitation [8], attempted to geometrize the material density of the spinor field of ½ spin and the equations similar to the Heisenberg's non-linear spinor equations. It was for the first time in history of science that quantum fields were unified with fields of inertia and torsion of space by Shipov in [7].

By 1977 G. Shipov completed Einstein's scientific program on geometrization of physics and started to develop his own scientific program on the Universal Relativity and the Theory of Physical Vacuum. He intensively used the works on spinor structure of the space-time developed by an outstanding mathematician Roger Penrose [9]. Shipov described the results of his researches in his first work published by the Moscow State University in 1979 [10]. In 1984 at All-Soviet Union Conference on the General Relativity Theory and Gravitation in Moscow he made his proposal [11] about spinor Equations of Physical Vacuum that were written down through Carmeli's spinor matrices [12] in the form of

$$\nabla_{[k}\sigma^{i]} - T_{[k}\sigma^{i]} - \sigma^{[i}T^{+}{}_{k]} = 0, \quad (A^s)$$

$$R_{kn} + 2\nabla_{[k}T_{n]} - [T_k, T_n] = 0, \quad (B^{s+})$$

$$R^{+}{}_{kn} + 2\nabla_{[k}T^{+}{}_{n]} - [T^{+}{}_k, T^{+}{}_n] = 0. \quad (B^{s-})$$

In these equations $i,k,n... = 0,1,2,3$ - represent coordinate indexes and $\sigma^{i}{}_{A\dot{B}}$ - are spinor

matrices (spinor $A = 0, 1, \ \dot{B} = \dot{0}, \dot{1}$ indexes in the equations (A) and (B) are neglected),

generalizing Pauli's matrices on a case of the curved and twisted space, R_{ACkn} , $R^{+}_{\dot{B}\dot{D}kn}$

- spinor matrices of Riemannian curvature (the sign + means Hermitian conjugation), T_{kCE},

T^{+}_{kBD} - spinor torsion matrices, one of three irreducible parts, which describes Dirac's spin (and antispin).

According to Shipov the Equations (A) and (B) describe the excited states of Physical Vacuum - elementary particles, and their solutions extend upon all the regions of space – sub light, light and super light. As well as in Dirac's equations, their solutions describe objects with negative energy - antiparticles. If energy in the solution equals zero, and the solution is non trivial, then such Shipov's object is defined as Primary Torsion Field transmitting the information without energy. Analyzing the solutions of the Vacuum Equations that give us new short-range potentials and comparing those particular solutions with experimental data on the elastic scattering of protons and neutrons on nucleus G. Shipov jointly with his colleagues E. Gubarev and A. Sidorov [13] came to conclusion, that gravitational, electromagnetic, weak, strong and quark interactions can be described by the Equations of Physical Vacuum.

In 1985 in his work [14] G. Shipov actually finds the answer to a question why the magnetic moment of an electron does not change. He introduces the Rotational Principle of Inertia and a concept of an inertial motion in rotational coordinates (for example, in Euler's angles). He demonstrated that, in absence of external fields and forces, in the vacuum physics there is an opportunity for any object "to rotate by inertia" according to the equations of geodesics of the spaces of absolute parallelism. The fact that follows directly from the equations shows that the objects's own angular moment (for example, spin of electron) does not change in this case.

In 1988 G. Shipov presents his "Program of the Universal Relativity and the Theory of Physical Vacuum" in [15] and his report "Program of the Universal Relativity and Geometry of Absolute Parallelism" at the VIIth All-Union Conference "Modern Theoretical and Experimental Problems of the Relativity Theory and Gravitation".

Two years later the Slovak physicist Vladimir Skalsky in an article published in scientific English magazine [17] has suggested to name the Equations (A) and (B) as **Shipov's Equations.**

Shipov's Vacuum Equations allow different presentations. In vector basis $e^{a}{}_{k}$ they can be presented in the form of Cartan's structural equations of geometry of the absolute parallelism, written down in a matrix form as

$$\nabla_{[k} e^{a}{}_{m]} = e^{b}{}_{[k} T^{a}{}_{|b|m]} = 0, \qquad (A)$$

$$R^{a}_{bkm} + 2\nabla_{[k} T^{a}_{|b|m]} + 2T^{a}_{c[k} T^{c}_{|b|m]} = 0, \qquad (B)$$

$$i,j,k... = 0,1,2,3, \quad a,b,c... = 0,1,2,3.$$

where the equations (A) represent Cartan's structural equations of the local group of translations T_4, and the equations (B) – Cartan's structural equations of local group of rotations $O\,(1.3)$ of the

geometry of absolute parallelism [18]. Accordingly, $i,j,k...$ - are coordinate indexes of the local group T_4 acting on 4D manifold of rotational coordinates x_i and $a,b,c...$ are coordinate indexes of the local group O (1.3) acting on 6D manifold of rotational coordinates (three spatial angles and three space-time angles).

Using a formalism of external differential forms, it is possible to present Shipov's Equations in the form of the first

$$de^a - e^c \wedge T^a{}_c = 0 \qquad (A)$$

and the second

$$R^a{}_b + dT^a{}_b - T^c{}_b \wedge T^a{}_c = 0 \qquad (B)$$

Cartan's structural equations of geometry of absolute parallelism.

Shipov's Equations (A) and (B) can be presented in the form of completely geometrized the system of equations (including sources) similar to extended system of the Einstein-Yang - Mills equations[18], containing: **Shipov Torsion Equations**

$$\nabla_{[k} e^a_{j]} + T^i_{[k\,j]} e^a_i = 0, \qquad (A)$$

generalized **Shipov-Einstein vacuum equations**

$$R^a{}_m - \frac{1}{2} g^a{}_m R = \nu T^a{}_m \qquad (B.1)$$

with geometrized energy-momentum tensor created by torsion field $\overset{\leftarrow}{T}_{bk}$ (or by material fields - quantum fields)

$$T_{jm} = -\frac{2}{\nu} \left\{ \left(\nabla_{[i} T^i_{|j|m]} + T^i_{s[j} T^s_{|i|m]} \right) - \frac{1}{2} g_{jm} g^{pn} \left(\nabla_{[i} T^i_{|p|n]} + T^i_{s[i} T^s_{|p|n]} \right) \right\}, \qquad (1)$$

generalized **Shipov –Yang-Mills equations**

$$C^a_{bkm} + 2\nabla_{[k} T^a_{|b|m]} + 2T^a_{c[k} T^c_{|b|m]} = -\nu J^a_{bkm} \qquad (B.2)$$

with geometrized tensor current

$$J_{ijkm} = 2\mathbf{g}_{[k(i} T_{j)m]} - \frac{1}{3} T \mathbf{g}_{i[m} \mathbf{g}_{k]j} , \qquad (2)$$

formed by means of energy-momentum tensor (1). In the equations (B.2) Wyle's tensor $\overset{\leftarrow}{C}_{bkm}$ is the Shipov-Yang-Mill's field and torsion field $\overset{\leftarrow}{T}_{bk}$ is the potential of the Shipov-Yang-Mill's field.

In the most general view, the Shipov's Equations can be written down in the form of extended and completely geometrized system of Heisenberg – Einstein-Yang-Mills equations including [18]:

4

1) nonlinear **Shipov- Heisenberg spinor equations**

$$\nabla_{\beta\dot{\chi}}\iota_\alpha = \nu o_\alpha o_\beta \overline{o}_{\dot{\chi}} - \lambda o_\alpha o_\beta \overline{\iota}_{\dot{\chi}} - \mu o_\alpha \iota_\beta \overline{o}_{\dot{\chi}} + \pi o_\alpha \iota_\beta \overline{\iota}_{\dot{\chi}} -$$

$$- \gamma \iota_\alpha o_\beta \overline{o}_{\dot{\chi}} + \alpha \iota_\alpha o_\beta \overline{\iota}_{\dot{\chi}} + \beta \iota_\alpha \iota_\beta \overline{o}_{\dot{\chi}} - \varepsilon \iota_\alpha \iota_\beta \overline{\iota}_{\dot{\chi}}, \qquad (\overset{+}{A}_{s^+}.1)$$

$$\nabla_{\beta\dot{\chi}}o_\alpha = \gamma o_\alpha o_\beta \overline{o}_{\dot{\chi}} - \alpha o_\alpha o_\beta \overline{\iota}_{\dot{\chi}} - \beta o_\alpha \iota_\beta \overline{o}_{\dot{\chi}} + \varepsilon o_\alpha \iota_\beta \overline{\iota}_{\dot{\chi}} -$$

$$- \tau \iota_\alpha o_\beta \overline{o}_{\dot{\chi}} + \rho \iota_\alpha o_\beta \overline{\iota}_{\dot{\chi}} + \sigma \iota_\alpha \iota_\beta \overline{o}_{\dot{\chi}} - \kappa \iota_\alpha \iota_\beta \overline{\iota}_{\dot{\chi}}, \qquad (\overset{+}{A}_{s^+}.2)$$

$$\alpha, \beta... = 0,1, \quad \dot{\chi}, \dot{\gamma}... = \dot{0}, \dot{1},$$

2) completely geometrized (including sources) **Shipov-Einstein spinor equations**

$$2\Phi_{AB\dot{C}\dot{D}} + \Lambda\varepsilon_{AB}\varepsilon_{\dot{C}\dot{D}} = \nu T_{A\dot{C}B\dot{D}} , \qquad (\overset{+}{B}_{s^+}.1)$$

3) completely geometrized (including sources) **Shipov-Yang-Mills spinor equations**

$$C_{AB\dot{C}\dot{D}} - \partial_{C\dot{D}}T_{A\dot{B}} + \partial_{A\dot{B}}T_{C\dot{D}} + \left(T_{C\dot{D}}\right)_A^F T_{F\dot{B}} + \left(T^+{}_{\dot{D}C}\right)_{\dot{B}}^{\dot{F}} T_{A\dot{F}} -$$

$$- \left(T_{A\dot{B}}\right)_C^F T_{F\dot{D}} - \left(T^+{}_{\dot{B}A}\right)_{\dot{D}}^{\dot{F}} T_{C\dot{F}} - \left[T_{A\dot{B}}T_{C\dot{D}}\right] = -\nu J_{A\dot{C}B\dot{D}} , \qquad (\overset{+}{B}_{s^+}.2)$$

$$A, B... = 0,1 , \quad \dot{B}, \dot{D}... = \dot{0}, \dot{1}$$

plus spinor equations of the left matter $\overline{A}_{s^+}, \overline{B}_{s^+}$ and for the right and left

antimatter. As a result G. Shipov came to a conclusion, that any object, born from Vacuum, is described by set of the equations similar to Heisenberg –Einstein-Yang-Mills. Without such set of equations the fundamental theory of elementary particles (but not phenomenological!) cannot be constructed.

In 2000 in Thailand G. Shipov started his unique experimental project on creation of the new kind of space propulsion system [19] that proved its feasibility and efficiency both as an outstanding theorist and a brilliant experimentalist. The joint group of Russian scientists worked hard to create the 4D gyroscopic propulsion system, operated by a computer program, which experimentally proved Shipov's theoretical forecasts. The novel propulsion system demonstrated the possibility to propel the inertial mass of 4D gyroscopic propulsion system by operating the **inner properties** of a   propulsion system that leads to the controlled motion of the center of mass according to Shipov's formula $E = m($

$\circledcirc)c^2$, where $\circledcirc$ denotes spin and $m(\circledcirc)$ **-** torsion mass.

In 2005, a year dedicated to Physics and 100 year Anniversary of Einstein's Special Relativity theory, in Belgium, Shipov presented his work "Descartesian Mechanics or the Fourth Generalization of Newtonian Mechanics" (first three generalizations: Special, General Relativity theories and Quantum mechanics). He informed the scientific society about the possibility to create a new type of propulsion

system that may move without "rejection of mass" in open space [20]. In 2008-2009 Khrunichev Space Institute, ГКНПЦ, led by Dr. Valery Menshikov, performed successful trials of the 4D gyroscopic propulsion in space [25], having challenged Russian Academic "Inquisition", so-called "pseudo committee" of RANS, who opposed those trials for several years, misinforming the Russian Government and the World Community.

However the Inertial Propulsion (4D Gyro or Vacuum Torsion Propulsion asit was named in the awarded Thai patent № 2522) required theoretical foundation. B 2002 Dr. Valery Menshikov invited us to come to his center for a dialogue on the possibility of the creation of new propulsion system and signed an MOU agreement.

Later on G. Shipov created the theoretical foundation as in [19].

As a theoretical substantiation of the observable phenomena G. Shipov applied 1+3 splitting the Equations of Physical Vacuum (Shipov- Raychaudhuri Equations)

$$\nabla_{[b}u_{a]} + T^c{}_{[ab]}u_c = 0, \qquad\qquad (A^{1+3})$$

$$R^d{}_{abc} - 2W_a(\omega_{bc} - W_{[b}u_{c]})u^d - 2\nabla_{[c}W_{|a|}u_{b]}u^d + 2\nabla_{[c}\omega_{|a|b]}u^d + +2\nabla_{[c}\sigma_{|a|b]}u^d +$$

$$+ \frac{2}{3}\Theta_{,[c}h_{b]a}u^d - \frac{2\Theta}{3}\left(u_a\omega_{bc} - u_aW_{[b}u_{c]} + \omega_{a[c}u_{b]} + \sigma_{a[c}u_{b]} + \frac{\Theta}{3}h_{a[c}u_{b]}\right)u^d = 0, \left(B^{1+3}\right)$$

where $T^a{}_{bc}$ is torsion field with Raychaudhuri's notations [21] it will look like

$$T^c{}_{ab} = -W_au_bu^c + \omega_{ab}u^c + \sigma_{ab}u^c + \frac{1}{3}\Theta h_{ab}u^c.$$

In absence of independent parameters σ_{ab} and Θ, G. Shipov finds the constraint equation for

4D acceleration of the center of mass of a 4D gyroscope W⍪ and 4D

angular velocity ω⍪ of masses inside it, in the form $\nabla_a\omega^a - W_a\omega^a = 0$ The split

Equations of Vacuum (A^{1+3}) as well as (B^{1+3}) allow to investigate the motion in space of generalized Alcubierre [22] bubble in a more detailed way.

Summary
Summarizing the above we can describe the most important results of Shipov's Vacuum Equations:

1. The space of events of the Theory of Physical Vacuum is 10- dimensional as well as it is of spinor structure.

2. The Quantum Theory following from the Equations of Physical Vacuum, describes dynamics of real physical fields - the fields of inertia connected with the physical object of any nature.

3. The discrete structure of physical systems created by Rotational Relativity, which studies 6 angular coordinates (three spatial and three space-time angles) as elements of space of events and reduces any real motion to rotation (Descartes' idea).

4. According to Shipov the Equations of Physical Vacuum describe seven levels of reality: I - solids, II - fluids, III - gases, IV - elementary particles (levels I-III form the Material World), V - Physical Vacuum, VI - Primary Torsion Fields, VII – Absolute "Nothing" that is expressed by the Equations of Physical Vacuum as identity $0 \equiv 0$. Levels V-VII form the World of the Highest Reality (see fig. 1).
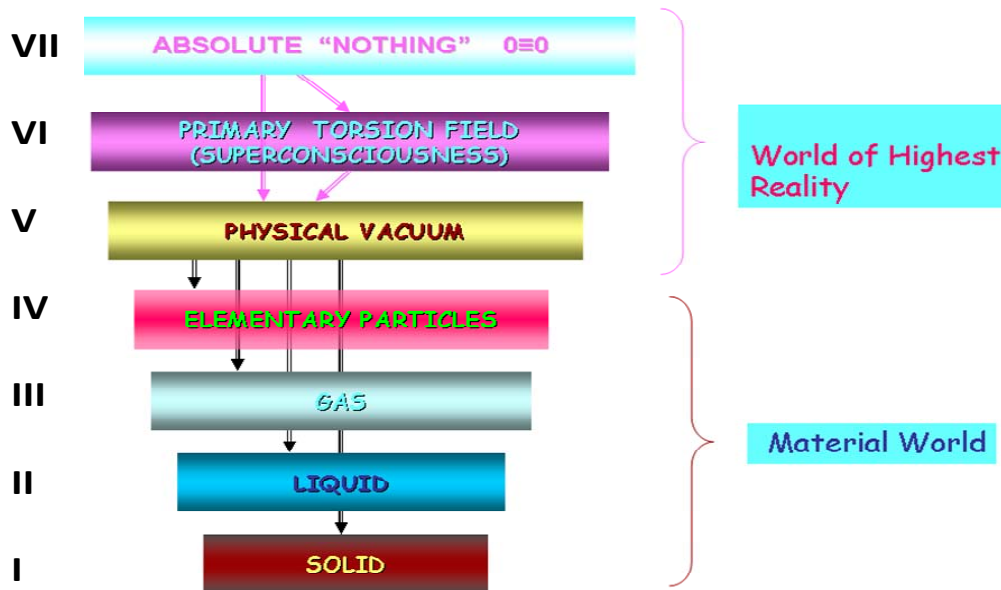

Fig.1. Seven levels of Reality in the Theory of Physical Vacuum

5. Primary and secondary torsion fields (secondary fields created by rotation of a matter, and primary fields are non material) allow to describe the phenomena of psychophysics (Ψ-phenomena), i.e. to describe consciousness of the person and to connect it with a Material World [23].

6. The Shipov's Vacuum Equations establish a foundation of 4-th Generalization of Newtonian Mechanics – Descartes' Mechanics that allows to control and operate the torsion properties (changes of curvature and torsion) of the surrounding space.
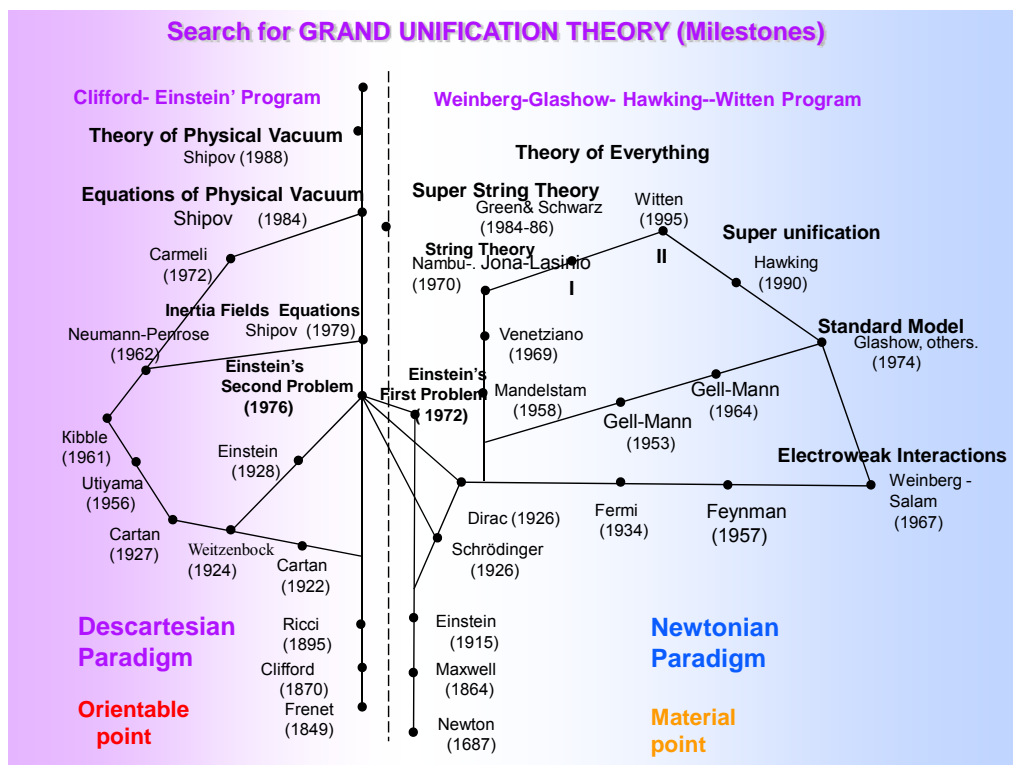
Fig.2. Parallel development of two scientific paradigms

7. Shipov's Vacuum Equations offered us a new scientific paradigm (see fig. 2), particularly Unifying Matter and Consciousness as a Unified Reality [24].

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