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The Meeting of Chronowaves as the Emergence of Conditions for the Formation of the Metagalaxy

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Abstract

This paper examines processes arising from the interaction of forward and reverse time flows. The proof is based on formulas derived by the author in [1]. These formulas yield an equation describing the interactions of these flows, which allows for a description of hyperreality existing in 5-dimensional space. It examines the existence of 3-dimensional space, taking into account the introduction of baryon time, which differs from proper time in 5-dimensional space. This approach allows us to establish the dependence of 3-dimensional volume on the additional dimension and develop a theory based on 3-dimensional time. This theory allows us to determine the baryon time of the Metagalaxy's existence, as well as the period of time that existed prior to its formation.

Keywords: time flows; Hubble vacuum, baryon mass, baryon time, radiation time, acceleration, interaction, constants, gravitational radius

Introduction

The problem of the origin of the Universe remains unsolved by humanity. The problem stems from the limitations of the human brain's perception of reality. All philosophical approaches are built on this limitation. The most famous of these is dialectical materialism. It is based on the concept of matter.

The term "matter" was coined by V. I. Lenin in his work "Materialism and Empiriocriticism" (1909): matter is "...a philosophical category for designating objective reality, which is given to man through his sensations, which is copied, photographed, and reflected by our sensations, existing independently of them."

Modern physics is based on the principle of materialism: all theories require experimental confirmation. Experimentation acts as an intermediary between the brain and the surrounding reality. If a theory is not confirmed, it is rejected by the scientific community. Thus, the basis of knowledge of the world lies in matter, i.e., matter and field, which interact with each other. Our brain observes and perceives this interaction, convincing itself of the correctness of its perception of the surrounding reality and considering it to be objective reality.

But another approach is also possible: that matter is a special case of something more general, a certain "nothing" that is hidden from our senses but reveals itself in the form of concepts such as space, time, and gravity. Many theories have been developed attempting to unify these manifestations of this mysterious "nothing."

The drawback of these theories is that they are based on the same matter to which the founders of dialectical materialism ascribed a number of postulates: uncreation and indestructibility; eternity of existence in time and infinity in space, among others. These postulates severely limit the development of science, as they block access to ideas that could be proposed to explain existing reality. Therefore, in the most well known theory general relativity matter, possessing mass, is the cause of the curvature of space-time, which is interpreted as the emergence of gravity. In Newton's theory of gravitation, gravity is a force that arises between two actually existing masses.

The author proposes a different approach to describing the world around us. It asserts that the concept of matter is secondary. The primary concept is the existence of a unified chrono-graviton field. This field is the very "nothing" that manifests itself as a single whole in the individual philosophical categories discussed above: space, time, matter, and gravity.

The basis of the unified field is formed by gravitons and chronons. They are elementons with extremely low mass and serve as the building blocks for the formation of elementary particles, which are created when the field reaches special states[2].

The description of the field is based on the theory of 3-dimensional time, outlined in the author's works[3]. Time in this theory is described using time vectors that have a common origin in the system of orthogonal chronocoordinates of 3-dimensional time $\psi, \tilde{\psi}$, τ.

The first chronocoordinate ψ is the proper time coordinate of space in the horizontal hyperplane. The second coordinate $\tilde{\psi}$ is the proper time coordinate of space in the vertical hyperplane. The third coordinate τ is the one-dimensional proper time. The transition from chronal coordinates to metric coordinates is accomplished by multiplying each by the speed of light: $l = c\psi$; $\tilde{l} = c\tilde{\psi}$; $s = c\tau$. The speed of light is the maximum speed of propagation in all three hyperplanes formed by the coordinates of three-dimensional time. The first hyperplane *l*, *s* is called the horizontal hyperplane and defines space-time, in which the ordinary spatial dimension is defined using *l* coordinates. In this hyperplane, two time vectors are defined: a falling vector and a duration vector. They can describe different chronotrajectories depending on the factors acting on them. The behavior of the vectors is governed by dual equations.

A similar situation exists with the vertical hyperplane $\tilde{l}, s$. It has its own time-duration vector, which is related to the duration vector of the horizontal hyperplane. The profile hyperplane $l, \tilde{l}$ is purely spatial and is related to the geometry of the chronal-graviton field. Using the chronal-graviton field as the basis for his research, the author developed a theory that allowed him to establish the values of the interaction constants that arise in a polarized vacuum. Based on these constants, he described a scenario involving the encounter of two chronal-graviton waves moving in helical lines toward each other along the axis $\tilde{l}$, which is the coordinate of three-dimensional time (see Figs. 1 and 2). The encounter resulted in the release of chronal energy from the chronal-graviton field. This energy should be understood as energy expressed solely in chronal coordinates. Therefore, it propagates instantaneously in the horizontal hyperplane along chronotrajectories determined from the dual equations of time. The pattern of their distribution is shown in Fig. 3. It describes the primary chronal energy state that preceded the formation of what we call the Metagalaxy.

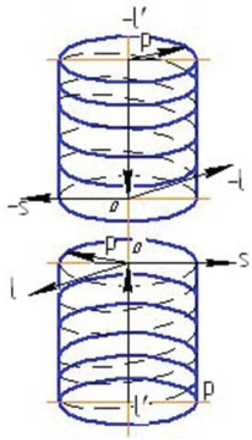

Fig. 1 Oncoming traffic chronal-graviton waves in 3-dimensional time.

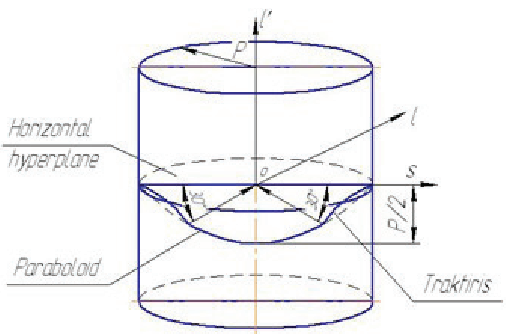

Fig.2 Interaction of chronological-graviton waves in the system coordinates of 3-dimensional time

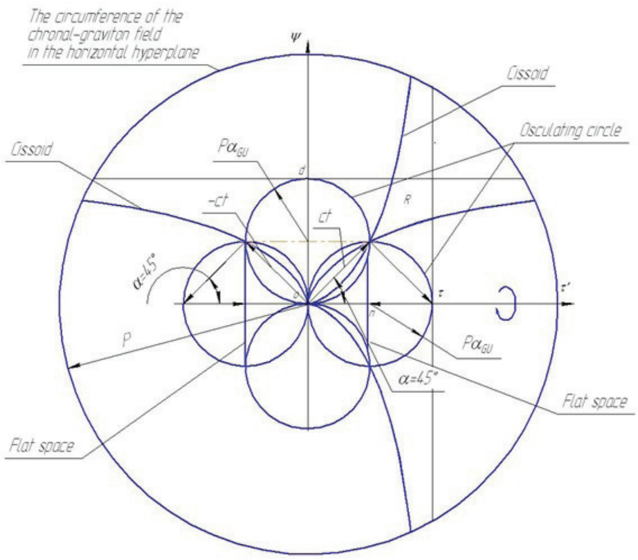

Fig. 3. Propagation of chronal energy in a horizontal hyperplane after its transfer from a vertical hyperplane.

1. What Led to the Beginning?

Let's give a brief excursion into the history of the beginning. It is based on the author'smathematical developments and boils down to the following. After the meeting of chronal-graviton flows in a horizontal hyperplane and the distribution of chronal energy along chronotrajectories from a common origin, two time vectors emerge, which we will interpret as directions of energy, having the usual energetic meaning accepted in physics (see Fig. 3). These time vectors propagate along straight lines at the speed of light within the chronotrajectories formed by chronal energies. We will be interested in the duration vector ct, moving within the right osculating circle at an angle $\alpha = 45^0$. It gives a projection onto the axis $l = c\psi$, coinciding with the incident vector $\widehat{ct}$, directed along this axis at an angle $\varphi = 2\alpha = 90^0$. We know the radius of the osculating circle. It is $P\alpha_{GU}$ equal to, where P is the graviton wavelength; $\alpha_{GU} = 1/4\pi^2$ is the Grand Unified Field (GUF) constant.

A similar vector, symmetrical to the right one, also appears in the circle. The vectors grow until they reach the lines of these circles. After this, the time vectors reflect off them and begin to move, each toward the pole of its own circle.

Reflection occurs again at the poles, but this time along the direct and inverse axes of proper time. Chronal energy waves emerge and begin to move toward each other. Upon reaching the centers of the circles, the waves encounter vertical lines, which are analogous to flat spaces. Contact between the chronowaves and these lines leads to the formation of black holes[2] in time (see Fig. 4).

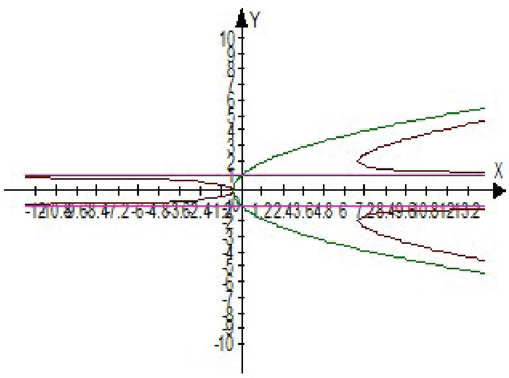

Fig. 4 Black hole in time.

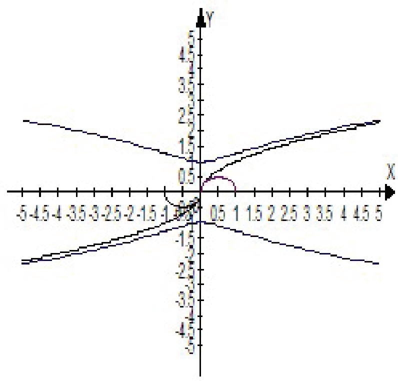

Fig. 5 Interaction of chronal flows.

Microscopic tunnels with radii equal to $2r_e$, where r_e, are the classical radius of an electron, arise within the holes. The properties of these tunnels are such that the mass-energy released upon contact acquire infinitely high velocities and accelerations at the tunnel peripheries and instantly find themselves at the center of the chronowave collision. As a result, two types of mass are generated at the center: one $M_б$ is the mass of baryonic matter in the future universe, and the other $M_{a.б}$ is an equal mass of antibaryonic matter. Along with the formation of masses, an inversion of chronowaves occurs, transforming them into parabolic temporal flows of duration. Naturally, the branches of the parabolas begin to act on the tunnel walls, pushing them apart in the spatial direction along the same time-duration. At the same time, the tunnel walls become curved. The resulting centrifugal force, created by the vacuum inside the tunnel along the spatial axis, begins to expand the walls of the tunnel in the spatial direction of the horizontal hyperplane at a superluminal speed according to an exponential law:

$$l = 2r_e e^{\frac{v_\psi}{c}} \tag{1}$$

In the author's work[1], a detailed mathematical scenario for the formation of these flows, which took forms described by parabolic functions (see Fig. 5), was presented.

For a direct flow:

$$s = \frac{l^2}{\frac{P}{\phi}} \tag{2}$$

Where: $\phi = \frac{9}{128\pi^2\alpha_e} = \frac{3\pi^2}{4\pi^2}\cdot\frac{3}{32\pi^2\alpha_e} = \frac{\alpha_{GU}}{\alpha_W(q)}\cdot\frac{\alpha_e(q)}{\alpha_e} = 0,976264433$ - constant ϕ -field;

$\alpha_W(q)$ - Constant of electroweak interaction in polarized vacuum;

$\alpha_e(q) = \frac{3}{32\pi^2} = 9,498860966\cdot10^{-3}$ - Electromagnetic constant in a polarized vacuum;

$\alpha_e = 1/137,036 = 7,297352521\cdot10^{-3}$ - ordinary electromagnetic constant.

$P = \ell_0\alpha_e^2 n_e^3 = 1,18964666\cdot10^{30}\,cm$ - graviton wavelength; $\ell_0 = m_0 G/c^2$ - fundamental Planck length; $n_e = m_0/m_e$ - number of electrons in the Planck mass.

For reverse flow

$$s = -\frac{l^2}{P} \tag{2b}$$

These functions form the basis for the description of that initial process, that "nothingness," which leads to the emergence of vacuum regions interacting with each other. Matter is not yet discussed. It arises during the collision of flows and is the result of their abrupt halt, leading to the formation of the aforementioned masses, released from the interacting energies.

2. Equation of Interacting Time Flows

To derive the equation, it is necessary to assume that the forward and reverse parabolic flows interact with each other. To do this, simply multiply the proper time coordinates in formulas (2a) and (2b).

$$s^2 = (-\frac{l^2}{P})\cdot\frac{l^2}{\frac{P}{\phi}} = -\frac{l^4}{\frac{P^2}{\phi}} \tag{3}$$

The resulting equation describes the birth and development of the universe in a horizontal hyperplane. To prove this, we will consider the graviton wavelength as the gravitational radius.

$$P = \frac{M_P G}{c^2}$$

This can be done because the graviton wavelength is expressed in terms of the Planck length, represented as the gravitational radius

$$P = \ell_0\alpha_e^2 n_e^3 = \frac{m_0 G}{c^2}\alpha_e^2 n_e^3 = \frac{M_P G}{c^2}$$

Where: $M_P = m_0\alpha_e^2 n_e^3$ - graviton mass, which forms the gravitational radius.

The formula allows us to make the transition from the gravitational radius directly to the total mass energy

$$\frac{c^4}{G}P = F_0 P = M_P c^2$$

Where: $\frac{c^4}{G} = F_0$ - Planck force.

We will widely use this approach, which converts distance into mass, in the future. Taking into account the obtained formula, we transform (3) as follows.

$$-\frac{1}{s^2} = \frac{P^2}{\phi l^4} = \frac{M_P{}^2 G^2}{\phi l^4 c^4} = \frac{M_P{}^2 G^2}{\frac{9}{128\pi^2 \alpha_e} l^4 c^4} = \frac{M_P{}^2 G^2}{\frac{3}{4} \cdot \frac{3}{32\pi^2 \alpha_e} l^4 c^4} = \frac{4\alpha_e M_P{}^2 G}{3 \cdot \alpha_e(q) l^4 \frac{c^4}{G}}$$

We bring it to the form

$$-\frac{\alpha_e(q)}{s^2}\frac{c^4}{G} = -\frac{3}{32\pi^2}\frac{F_0}{s^2} = \frac{4\alpha_e M_P{}^2 G}{3 \cdot l^4} \tag{4a}$$

The resulting equation describes the equality of forces in 5-dimensional space according to Ehrenfest's formula[5]. Thus, the equation of interacting chronowaves reduces to a description of a certain hyperreality. It is an environment in which processes can emerge that facilitate the birth of universes with different properties.

We will consider one such universe in this section: a stationary universe. To transition to such a universe, we express the graviton mass in terms of a spherical volume of radius l using the formula:

$$M_P = \rho(l) \cdot \frac{4}{3}\pi l^3$$

Substitute into (4a)

$$-\frac{\alpha_e(q)}{s^2} F_0 = \frac{4\alpha_e M_P{}^2 G}{3 \cdot l^4} = \frac{4\alpha_e}{3}\frac{M_P \rho(l)\frac{4}{3}\pi l^3 G}{l^4} = \frac{M_P \alpha_e \cdot \rho(l)\frac{16}{9}\pi G}{l} = \frac{M_P \alpha_e \cdot \rho(l) G}{l \cdot (\frac{3}{4\sqrt{\pi}})^2} \tag{4b}$$

Let us represent the Planck force as:

$$F_0 = \frac{c^4}{G} = \frac{(M_P \alpha_{GU})^2 G}{(P\alpha_{GU})^2}$$

Substituting into (4b), we obtain:

$$-\frac{\alpha_e(q)}{s^2}\frac{(M_P \alpha_{GU})^2 G}{(P\alpha_{GU})^2} = \frac{M_P \alpha_e \cdot \rho(l) G}{l \cdot (\frac{3}{4\sqrt{\pi}})^2} \tag{4c}$$

Where: $(\frac{3M_P \alpha_{GU}}{4\sqrt{\pi}})^2 = M_H^2$ - square of the Hubble vacuum mass.

From the mas M_Hs, we can obtain the value of the length in the form of a gravitational radius, which we will call the Hubble radius:

$$ct_H = \frac{M_H G}{c^2} = \frac{3M_P \alpha_{GU} G}{4\sqrt{\pi} c^2} = \frac{3}{4\sqrt{\pi}} \cdot P\alpha_{GU} \tag{5a}$$

Where:

$ct_H = 2{,}99792458 \cdot 10^{10} \cdot 4{,}24552662 \cdot 10^{17} = 1{,}272776861 \cdot 10^{28} cm$ - Hubble radius;

$t_H = 4{,}24552662 \cdot 10^{17} \sec = 13{,}4535498 \cdot 10^9 \, years$ - Hubble time.

The Hubble constant is equal to:

$$H = \frac{1}{t_H} = \frac{1}{4{,}24552662 \cdot 10^{17}} = 2{,}355420398 \cdot 10^{-18} c^{-1} \cdot 3{,}0842208 \cdot 10^{19} \frac{\kappa m}{Mpc} = 72{,}64636584 \frac{\kappa m}{Mpc} \tag{5b}$$

Experimental significance: $H = 73 \pm 1 \kappa m / c \cdot Mpc$ [7]

Thus, it was possible to determine the Hubble constant time using a formula that includes constants.

Let's continue transforming formula (4c). Substituting the value $\alpha_e(q)$, we obtain:

$$-\frac{3}{32\pi Gc^2\tau^2}\cdot\frac{M_H{}^2G}{\pi(P\alpha_{GU})^2}=\frac{M_P\alpha_e\cdot\rho(l)}{l} \qquad (6a)$$

Where:

$-\frac{3}{32\pi G\tau^2}=-\frac{\varepsilon(\tau)}{c^2}=-\rho(\tau)$ there is a variable density of radiation energy.

Then the equation can be written as :

$$-\rho(\tau)\cdot\frac{M_H{}^2G}{\pi(P\alpha_{GU})^2}=\frac{M_P\alpha_e\cdot\rho(l)c^2}{l} \qquad (6b)$$

Let us consider the condition of equality of both densities:

$$\rho(\tau)=\rho(l)$$

By canceling out the density, we obtain the equality of the gravitational vacuum force arising in the Hubble vacuum to the centrifugal chronal force in the chronal electromagnetic vacuum:

$$-\frac{M_H{}^2G}{(P\alpha_{GU})^2}=\frac{\pi M_P\alpha_e c^2}{l} \qquad (6c)$$

This equality of forces is characteristic of the case of a stationary universe with three spatial dimensions.

From it we find the radius of the vacuum l :

$$-l=\frac{\pi M_P\alpha_e c^2}{M_H{}^2G}(P\alpha_{GU})^2=\frac{\pi M_P\alpha_e G}{c^2(\frac{3P\alpha_{GU}}{4\sqrt{\pi}})^2}(P\alpha_{GU})^2=\frac{\pi M_P\alpha_e G}{c^2\frac{9}{16\pi}}=\frac{16\pi^2P\alpha_e}{9}=\frac{0{,}12803908P\alpha_{GU}}{\alpha_{GU}}=5{,}054780274P\alpha_{GU}$$

This radius length occurs at a vacuum density of:

$$\rho(l)=\frac{M_P}{\frac{4}{3}\pi l^3}=-\frac{M_P}{\frac{4}{3}\pi(\frac{16\pi^2P\alpha_e}{9})^3}=-\frac{M_P}{\frac{4}{3}\pi(\frac{16\pi^2P\alpha_e}{9})^2\cdot\frac{16\pi^2M_P\alpha_e G}{9c^2}}=-\frac{c^2}{\frac{4}{3}\pi(\frac{16\pi^2P\alpha_e}{9})^2\cdot\frac{16\pi^2\alpha_e G}{9}}=$$

$$=-\frac{1}{\frac{4}{3}\pi(\frac{16\pi^2\alpha_e}{9})^3}\cdot\frac{c^2}{P^2G}=-113{,}7322824\cdot\frac{(3\cdot10^{10})^2}{(1{,}18964666\cdot10^{30})^2 6{,}672\cdot10^{-8}}=-1{,}084012393\cdot10^{-30}\,g/cm^3$$

Where:

$$P=\ell_0\alpha_e^2n_e^3=1{,}6160456\times10^{-33}\frac{1}{137{,}036^2}\cdot(2{,}4\cdot10^{22})^3=1{,}18964666\cdot10^{30}\,cm$$

Finding time τ:

$$\tau=\sqrt{-\frac{3}{32\pi G\rho(l)}}=\sqrt{-\frac{3}{32\pi 6{,}672\cdot10^{-8}(-1{,}084012393\cdot10^{-30})}}=\sqrt{4{,}126018005\cdot10^{35}}=6{,}423408756\cdot10^{17}\sec$$

$$=\frac{6{,}423408756\cdot10^{17}}{4{,}24552662\cdot10^{17}}ct_H=1{,}512982801ct_H$$

The found emission time exceeds the Hubble time by 1.5 times and, of course, does not correspond to observational data.

3. The Connection of Proper Time with a 3-Dimensional Gravitational Volume

An attempt to reduce equation (6a) to the equality of forces in a stationary universe was unsuccessful. It was not taken into account that the left-hand side of the equation should describe the radiation time period, which should coincide with the Friedmann equation derived from the equations of general relativity[4]. The right-hand side of the equation, however, describes radiation processes occurring in a four-dimensional space. In this space, a three-dimensional gravitational volume should begin to form during the radiation time. Taking this correction into account, we writeequation (6a) as:

$$\frac{3}{32\pi G\tau^2}=-\frac{\pi(P\alpha_{GU})^2}{M_H{}^2G}\cdot\frac{M_P\alpha_e\cdot M_P}{\frac{4}{3}\pi l^4}c^2 \qquad (7a)$$

By transforming the left side it can be reduced to the form:

$$\frac{3}{32\pi G\tau^2} = -\frac{M_P\alpha_e \cdot M_P}{l^4} \cdot (\frac{9}{2}\frac{M_P\alpha_{GU}G}{18}) \cdot \frac{4\sqrt{\pi}G}{ct_H c^4} = -\frac{M_P\alpha_e \cdot M_P}{l^4} \cdot (\frac{9}{2}M_{б}G) \cdot \frac{4\sqrt{\pi}G}{ct_H c^4} \qquad (7b)$$

Where: $M_{б} = \frac{M_P\alpha_{GU}}{18} = 0,05555 M_P\alpha_{GU} = 5,6\%(M_P\alpha_{GU})$ there is a baryonic mass of the Metagalaxy.

As mentioned above, baryon mass, along with antibaryon mass, was formed at the moment of chronowave collision. The expression in parentheses is part of the formula for a 3-dimensional volume. We transform the equation as follows:

$$\frac{1}{l^3} \cdot (\frac{9}{2}\frac{M_P\alpha_{GU}G}{18})\tau^2 = -\frac{3l}{32\pi \cdot \frac{4\sqrt{\pi}}{ct_H}\frac{M_P\alpha_e G \cdot M_P}{c^4}G} = -\frac{9}{128\pi^2\alpha_e \cdot \frac{4\pi \cdot 4}{P\alpha_{GU}}\frac{P \cdot P}{l}} = -\frac{l}{\frac{16\pi}{\alpha_{GU}}\frac{\cdot P}{\phi}}$$

We transform the denominator of the right side to the form:

$$\frac{16\pi}{\alpha_{GU}}\frac{\cdot P}{\phi} = \frac{16\pi}{(\alpha_{GU})^2}\frac{\cdot P\alpha_{GU}}{\phi} = \frac{4\sqrt{\pi}}{3}\frac{16\pi}{(\alpha_{GU})^2}(\frac{3}{4\sqrt{\pi}} \cdot \frac{P\alpha_{GU}}{\phi}) = \frac{64\pi\sqrt{\pi}}{3(\alpha_{GU})^2}(\frac{ct_H}{\phi}) =$$

$$= \frac{64\pi\sqrt{\pi}}{3}16\pi^4(\frac{ct_H}{\phi}) = 8\pi\sqrt{\pi}\pi^2 \cdot \frac{8 \cdot 16\pi^2}{3}(\frac{ct_H}{\phi}) = \frac{3 \cdot 8\pi^3\sqrt{\pi}}{\alpha_e} \cdot \frac{128\pi^2\alpha_e}{9}(\frac{ct_H}{\phi}) = \frac{24\pi^3\sqrt{\pi}}{\alpha_e} \cdot (\frac{ct_H}{\phi^2})$$

Then the equation will take the form:

$$\frac{1}{l^3} \cdot (\frac{9}{2}\frac{M_P\alpha_{GU}G}{18})t_{б}^2\frac{\tau^2}{t_{б}^2} = -\frac{l}{\frac{16\pi}{\alpha_{GU}}\frac{\cdot P}{\phi}} = -\frac{l}{\frac{24\pi^3\sqrt{\pi}}{\alpha_e} \cdot (\frac{ct_H}{\phi^2})} \qquad (7c)$$

Where: $t_{á}^2$ - the square of baryon time included in the 3-dimensional gravitational volume.

Let us isolate the 3-dimensional volume in this equation by transforming it to the form:

$$\frac{\frac{9}{2}\frac{M_P\alpha_{GU}G}{18}t_{б}^2}{l^3} = 1 = -\frac{l}{\frac{24\pi^3\sqrt{\pi}}{\alpha_e} \cdot (\frac{ct_H}{\phi^2})}\frac{t_{б}^2}{\tau^2} \qquad (7b)$$

From (7d) follows the connection between the square of proper time and the additional spatial dimension

$$-s^2 = \frac{l}{ct_H} \cdot \frac{c^2}{\frac{24\pi^3\sqrt{\pi}}{\phi^2\alpha_e}} \cdot t_{б}^2 = \frac{l}{ct_H} \cdot v_{б.х.в.}^2 \cdot t_{б}^2 \qquad (8a)$$

Where:

$v_{б.х.в.}^2 = \frac{c^2}{\frac{24\pi^3\sqrt{\pi}}{\phi^2\alpha_e}}$ - the square of the course of baryon time in a 3-dimensional volume.

Let us determine the numerical value of the passage of time:

$$v_{б.х.в.} = \sqrt{\frac{c^2}{\frac{24\pi^3\sqrt{\pi}}{\phi^2\alpha_e}}} = \frac{c\phi}{2\pi}\sqrt{\frac{\alpha_e}{6\pi\sqrt{\pi}}} = \frac{c\phi}{2\pi}\sqrt{2,18418423 \cdot 10^{-4}} = 2,296318939 \cdot 10^{-3}c$$

Equation (8a) is reduced to the form

$$-\frac{1}{t_{б}^2} \cdot \frac{s^2}{l} = \frac{v_{б.х.в.}^2}{ct_H} \qquad (8b)$$

The right-hand side of the equation can be viewed as a constant acceleration arising during helical motion. We'll prove this by expressing it through the second part of the acceleration formula. Taking into account (3), we obtain an equation for the equality of accelerations in a helical line:

$$\frac{v_{б.х.в.}^2}{ct_H} = -\frac{1}{t_б^2}\cdot\frac{s^2}{l} = -\frac{1}{t_б^2}\cdot\frac{1}{l}\left(-\frac{l^4}{\frac{P^2}{\phi}}\right) = \frac{1}{t_б^2}\cdot\left(\frac{l^3}{\frac{P^2}{\phi}}\right) = \frac{1}{t_б^2}\cdot\left(\frac{1}{\frac{P^2}{\phi}}\frac{9}{2}\frac{M_P\alpha_{GU}G}{18}t_б^2\right) =$$

$$= \left(\frac{1}{\frac{P^2}{\phi}}\frac{9}{2}\frac{M_P\alpha_{GU}G}{18}\right) = \left(\frac{\phi c^2}{P^2}\frac{M_P\alpha_{GU}G}{4c^2}\right) = \frac{\phi c^2}{P^2}\cdot\frac{M_{т.м.}G}{c^2} = \frac{\phi c^2}{P^2}\cdot P_{т.м.}$$

Where: $M_{т.м.} = M_P\alpha_{GU}/4 = 0,25M_P\alpha_{GU} = 25\%M_P\alpha_{GU}$ - dark matter mass;

$P_{т.м.} = \frac{M_P\alpha_{GU}G}{4c^2}$ - gravitational radius of dark matter.

We introduce the designations of the parameters of the helical line:

$v_{б.х.в.}^2 = v_{абс}^2$ - square of absolute velocity; $ct_H = \rho_{в.л}$ - radius of curvature of the helix;

$P_{т.м.} = R_ц$ - radius of the cylinder; $\frac{\phi c^2}{P^2} = \Omega_{т.м}{}^2$ - square of angular velocity.

Then the equation of equality of accelerations in a helical line will take the form:

$$\frac{v_{б.х.в.}^2}{ct_H} = \frac{\phi c^2}{P^2}\cdot P_{т.м.} \quad \text{or} \quad \frac{v_{абс}^2}{\rho_{в.л.}} = \Omega_{т.м}{}^2\cdot R_ц$$

We determine the square of the sine of the angle of inclination of the radius of curvature in a helical line.

$$\sin^2\gamma = \frac{P_{т.м}}{ct_H} = \frac{P\alpha_{GU}}{4\frac{3P\alpha_{GU}}{4\sqrt{\pi}}} = \frac{\sqrt{\pi}}{3} = 0,59081795; \quad \sin\gamma = 0,76864683; \quad \gamma = 50,23253045°$$

Taking into account the equality of accelerations in the helical line, equation (8b) will take its final form:

$$-\frac{1}{t_б^2}\cdot\frac{s^2}{l} = \frac{v_{б.х.в.}^2}{ct_H} \tag{8c}$$

It connects two types of spaces: 4-dimensional space with time and 3-dimensional space with time $t_б$. Both spaces, and therefore both times, arise simultaneously after the interaction of parabolic time flows. At this moment, the black hole's tunnel begins to expand in the spatial direction due to the vacuum according to law (1). Substituting function (1) into (3), we obtain the expansion law for s^2:

$$s^2 = -\frac{l^4}{\frac{P^2}{\phi}} = -\frac{(2r_e e^{\frac{v_\psi}{v_{0л}}})^4}{\frac{P^2}{\phi}} = -\frac{16r_e{}^4 e^{\frac{4v_\psi}{v_{0л}}}}{\frac{P^2}{\phi}} \tag{9}$$

Substituting (9) into (8c), we obtain two equations:

$$\frac{\phi c^2}{P^2}\cdot P_{т.м.} = -\frac{1}{t_б^2}\cdot\frac{s^2}{l} = -\frac{1}{t_б^2}\cdot\frac{\left(-\frac{16r_e{}^4 e^{\frac{4v_\psi}{v_{0л}}}}{\frac{P^2}{\phi}}\right)}{2r_e e^{\frac{v_\psi}{v_{0л}}}} = \frac{1}{t_б^2}\cdot\left(\frac{8r_e{}^3 e^{\frac{3v_\psi}{v_{0л}}}}{\frac{P^2}{\phi}}\right) = \frac{1}{t_б^2}\cdot\left(\frac{l^3}{\frac{P^2}{\phi}}\right) \tag{10a}$$

$$\frac{v_{б.х.в.}^2}{ct_H} = -\frac{1}{t_б^2}\cdot\frac{s^2}{l} = \frac{1}{t_б^2}\cdot\left(\frac{l^3}{\frac{P^2}{\phi}}\right) \tag{10b}$$

From the first equation follows the formula for the gravitational 3-dimensional volume.

$$l^3 = P_{т.м.}c^2t_б^2 = \frac{9}{2}M_бGt_б^2 \tag{11a}$$

From the second equation follows the function for a 3-dimensional volume in a different form:

$$l^3 = \frac{P^2}{\phi}\frac{v_{б.х.в.}^2t_б^2}{ct_H} = \frac{P^2}{ct_H\phi}v_{б.х.в.}^2t_б^2 \tag{11b}$$

Let's show that the second function describes the spatial coordinate of the vertical hyperplane. We'll write it as follows:

$$\frac{l^3}{\frac{P^2}{\phi}} = \frac{v_{б.х.в.}^2t_б^2}{ct_H} = \tilde{l} \tag{11c}$$

Where: $\tilde{l}$ - is the spatial coordinate of the vertical hyperplane in 3-dimensional time.

Let's transform $\tilde{l}$ it into the form:

$$\tilde{l} = \frac{l^3}{\frac{P^2}{\phi}} = \frac{v_{б.х.в.}^2t_б^2}{ct_H} = \frac{sl}{P} \tag{11d}$$

The resulting equation describes the geometry of three-dimensional time as a hyperbolic paraboloid. The equation yields a function for a straight parabolic flow.

$$s = \frac{l^2}{\frac{P}{\phi}} = \frac{v_{б.х.в.}^2t_б^2}{ct_H}\frac{P}{l}$$

As we see, it consists of two functions. The first coincides with (2a). The second is associated with the second reverse flow. The conclusion follows from the equation following from (8c) and (12a).

$$-\frac{s^2}{l} = \frac{v_{б.х.в.}^2t_б^2}{ct_H} = \frac{sl}{P} = \tilde{l} \tag{12}$$

From here we arrive at the parabolic function of the reverse flow (2b):

$$\frac{l^2}{P} = -s$$

Thus, we arrive at four functions for the spatial coordinate of the vertical hyperplane.

$$\tilde{l} = \frac{l^3}{\frac{P^2}{\phi}} = \frac{v_{б.х.в.}^2t_б^2}{ct_H} = \frac{sl}{P} = -\frac{s^2}{l} \tag{13}$$

Let us show that the geometry of 3-dimensional time is the basis for 4-dimensional volume. The conclusion follows from the equation composed of (3), (12), and (11a):

$$s^2 = -\frac{l^4}{\frac{P^2}{\phi}} = -\frac{v_{б.х.в.}^2t_б^2}{ct_H}l = -\frac{v_{б.х.в.}^2}{ct_H}\sqrt[3]{P_{т.м}c^2}\cdot t_б^{\frac{8}{3}}$$

From it we find l^4:

$$l^4 = \frac{v^2_{б.х.в.} t^2_б}{ct_H} \frac{P^2}{\phi} \cdot l = \tilde{l} \cdot l \frac{P^2}{\phi} = \frac{P^2}{\phi} \cdot \frac{v^2_{б.х.в.}}{ct_H} \sqrt[3]{P_{т.м} c^2} \cdot t_б^{\frac{8}{3}} \tag{14a}$$

Taking into account the equality of accelerations in the helical line (8c), the 4-dimensional volume can be written as:

$$l^4 = \frac{P^2}{\phi} \cdot \frac{v^2_{б.х.в.}}{ct_H} \sqrt[3]{P_{т.м} c^2} \cdot t_б^{\frac{8}{3}} = \frac{P^2}{\phi} \cdot \frac{\phi c^2}{P^2} \cdot P_{т.м.} \sqrt[3]{P_{т.м} c^2} \cdot t_б^{\frac{8}{3}} = c^2 P_{т.м.} \sqrt[3]{P_{т.м} c^2} \cdot t_б^{\frac{8}{3}} = \sqrt[3]{P^3_{т.м.} P_{т.м} c^6 c^2} \cdot t_б^{\frac{8}{3}} = \sqrt[3]{P^4_{т.м.} c^8 t_б^8}$$

As we can see, a 4-dimensional volume contains the product of four 3-dimensional volumes:

$$l^4 = \sqrt[3]{P^4_{т.м.} c^8 t_б^8} = \sqrt[3]{(P_{т.м.} c^2 t_б^2)^4} = \sqrt[3]{(l^3)^4} = \sqrt[3]{(l^3)\cdot(l^3)\cdot(l^3)\cdot(l^3)} = \sqrt[3]{l^{12}} \tag{14b}$$

Thus, in a 4-dimensional space, there can be four absolutely identical interacting 3-dimensional volumes existing in baryon time. If one volume is considered the flat space of the universe, then in the 4-dimensional volume, there are four absolutely identical 3-dimensional universes interacting.

Taking the square root, we obtain the radius of the 4-dimensional volume as a function of baryon time:

$$l = \sqrt[4]{\frac{P^2}{\phi} \cdot \frac{v^2_{б.х.в.}}{ct_H} \sqrt[3]{P_{т.м} c^2} \cdot t_б^{\frac{8}{3}}} = \sqrt[4]{\frac{P^2}{\phi} \cdot \frac{v^2_{б.х.в.}}{ct_H} \sqrt[3]{P_{т.м} c^2}} \cdot t_б^{\frac{2}{3}} \tag{14c}$$

But from (14a) follows the formula:

$$\frac{1}{\tilde{l} \cdot l} = \frac{P^2}{l^4 \phi} = \frac{M_P \cdot \frac{M_P}{\varphi} G}{l^4} \cdot \frac{G}{c^4} = \frac{M_P \cdot \frac{M_P}{\varphi} G}{l^4} \cdot \frac{1}{F_0}$$

It is reduced to the form:

$$\frac{F_0}{\tilde{l} \cdot l} = \frac{M_P \cdot \frac{M_P}{\varphi} G}{l^4} \tag{14d}$$

And can be considered as a gravitational interaction between the masses of the forward and reverse flows in a 5-dimensional space. Such a space is the space of a 5-dimensional sphere. Dividing both sides by $8\pi^2/3$, we obtain:

$$\frac{F_0}{\frac{8\pi^2}{3} \tilde{l} \cdot l} = \frac{M_P \cdot \frac{M_P}{\phi} G}{\frac{8\pi^2}{3} l^4} \tag{14e}$$

Expression $\sin^2 \alpha_{GU} = \frac{3}{8} = \frac{\alpha_e(q)}{\alpha_{GU}}$ is the square of the sine of the Weinberg angle for the Grand Unification Field (GUN), then with its application the equation of equality of forces in the 5-dimensional sphere will take the form:

$$\frac{\alpha_e(q) F_0}{\pi^2 \tilde{l} \cdot l} = \frac{M_P \alpha_{GU} \cdot \frac{M_P}{\phi} G}{\frac{8\pi^2}{3} l^4} = \frac{M_P \alpha_{GU} c^2 \cdot \frac{M_P}{\phi} \frac{G}{c^2}}{\frac{8\pi^2}{3} l^4} = \frac{M_P \alpha_{GU} c^2}{\frac{8\pi^2}{3} \cdot \frac{l^4}{\frac{P}{\phi}}} \tag{14f}$$

The left-hand side represents Planck's electromagnetic force. The gravitational force between two interacting vacuum masses belonging to different vacuums balances the right-hand side. The equation thus unifies electromagnetism and gravity in the space of a 5-dimensional sphere.

4. Acceleration in 4-dimensional Space

A 4-dimensional volume is a space in which a universe can emerge.

The acceleration in it is a positive antigravitational acceleration that affects all coordinates of 3-dimensional time. It manifests itself as the action of dark energy, which accelerates the expansion of the vacuum. This scenario follows from observational data. However, the theory of this process does not follow from general relativity. This is because Einstein's gravitational field equation is incomplete. After Friedmann's modernization, only the first part of the solution, in which the time flow is positive, was obtained. The second part of the equation, describing the reverse flow, was not taken into account by Einstein when deriving the acceleration equation. Therefore, it turned out to be negative.

The resulting equation (7a) describes the action of both time flows and forms the basis for deriving the acceleration formula. We write it as an equality of energy density in 5-dimensional space:

$$\varepsilon_5(\tau) = \frac{3c^2}{32\pi G\tau^2} = -\frac{\kappa}{l^4} \tag{15}$$

Where: $\kappa = \dfrac{M_P\alpha_e \cdot M_P}{\frac{4}{3}\pi} c^4 \dfrac{\pi(P\alpha_{GU})^2}{M_H{}^2 G} = \dfrac{M_P\alpha_e \cdot M_P G}{\frac{4}{3}} \cdot \dfrac{(P\alpha_{GU})^2}{\frac{M_H{}^2 G^2}{c^4}} = \dfrac{3M_P\alpha_e \cdot M_P G}{4} \cdot \dfrac{(P\alpha_{GU})^2}{(ct_H)^2}$

There is a gravitational interaction of masses not associated with the baryonic mass of matter.

From (15) we find: l:

$$l = \sqrt[4]{-\frac{\kappa 32\pi G\tau^2}{3c^2}} = \sqrt[4]{-\frac{\kappa 32\pi G}{3c^2}}\tau^{\frac{1}{2}} \tag{16}$$

Using the function l, we determine the velocity function over time of the radiation. We square (16) and, after differentiation and transformation, find the velocity:

$$\dot{l} = \frac{dl}{d\tau} = \frac{1}{2l}\sqrt{-\frac{32\pi G\kappa}{3c^2}} = \sqrt{-\frac{32\pi G\kappa}{3c^2 \cdot 4l^2}} = \sqrt{-\frac{8\pi G\kappa}{3c^2 l^2}} \tag{17a}$$

We square the speed:

$$\dot{l}^2 = -\frac{8\pi G\kappa}{3c^2 l^2} = -\frac{8\pi G\kappa}{3c^2 l^4} l^2 = \frac{8\pi G}{3c^2}\varepsilon_5(\tau) l^2 \tag{17b}$$

Thus, we arrive at an equation that is similar to the Friedmann equation for a flat universe[4 p. 27], but differs from it by the minus sign.

We move from the square of velocity to acceleration by differentiating with respect to proper time. τ:

$$d(\dot{l}^2) = 2\dot{l}d\dot{l} = \frac{8\pi G}{3c^2} d(\varepsilon_5(\tau) l^2) = \frac{8\pi G}{3c^2}(\varepsilon_5(\tau) dl^2 + l^2 d\varepsilon_5(\tau)) = \frac{8\pi G}{3c^2}(2l\varepsilon_5(\tau) dl + l^2 d\varepsilon_5(\tau))$$

Divide by $d\tau$:

$$2\dot{l}\frac{d\dot{l}}{d\tau} = \frac{8\pi G}{3c^2}[2l\varepsilon_5(\tau)\frac{dl}{d\tau} + l^2 \frac{d\varepsilon_5(\tau)}{d\hat{t}_{5u}}]$$

We find the second derivative:

$$\ddot{l} = \frac{d\dot{l}}{d\tau} = \frac{8\pi G}{3c^2}[\frac{2l\varepsilon_5(\tau)}{2\dot{l}}\frac{dl}{d\tau} + \frac{l^2}{2\dot{l}}\frac{d\varepsilon_5(\tau)}{d\tau}] = \frac{8\pi G}{3c^2}[\frac{2l\varepsilon_5(\tau)}{2\dot{l}} \cdot \dot{l} + \frac{l^2}{2\dot{l}}\frac{d\varepsilon_5(\tau)}{d\tau}] = \frac{8\pi G}{3c^2}[l\varepsilon_5(\tau) + \frac{l^2}{2\dot{l}}\frac{d\varepsilon_5(\tau)}{d\tau}] = \frac{8\pi Gl}{3c^2}[\varepsilon_5(\tau) + \frac{l}{2\dot{l}}\frac{d\varepsilon_5(\tau)}{d\tau}]$$

Where:

$$\frac{l}{2\dot{l}}\frac{d\varepsilon_5(\tau)}{d\tau} = \frac{l}{2\dot{l}}\frac{d(-\frac{\kappa}{l^4})}{d\tau} = -\frac{l\kappa}{2\dot{l}}\frac{dl^{-4}}{d\tau} = -(\frac{-4l\kappa}{2\dot{l}})\frac{l^{-5}dl}{d\tau} = \frac{4l\kappa}{2\dot{l}} l^{-5}\dot{l} = 2l \cdot \kappa l^{-5} = 2\kappa l^{-4} = 2\frac{\kappa}{l^4} = -2\varepsilon_5$$

Substituting, we get:

$$\ddot{l} = \frac{d\dot{l}}{d\hat{t}_{5u}} = \frac{8\pi Gl}{3c^2}[\varepsilon_5(\tau) + \frac{l}{2\dot{l}}\frac{d\varepsilon_5(\tau)}{d\tau}] = \frac{8\pi Gl}{3c^2}[\varepsilon_5(\tau) - 2\varepsilon_5(\tau)] = -\frac{8\pi Gl}{3c^2}\varepsilon_5(\tau) = \frac{8\pi Gl}{3c^2}\cdot\frac{\kappa}{l^4} \tag{17c}$$

We use the notation: κ:

$$\ddot{l} = \frac{d\dot{l}}{d\hat{t}_{5u}} = \frac{8\pi Gl}{3c^2}\frac{\kappa}{l^4} = \frac{8\pi Gl}{3c^2}\cdot\frac{3M_P\alpha_e\cdot M_PG}{4l^4}\cdot\frac{(P\alpha_{GU})^2}{(ct_H)^2} = \frac{8\pi G}{3c^2}\cdot\frac{\pi M_P\alpha_e\cdot M_PG}{\frac{4}{3}\pi l^3}\frac{16\pi}{9} = \frac{8\pi G}{3c^2}\cdot\frac{M_P\alpha_e\cdot M_PG}{\frac{4}{3}\pi l^3}\frac{32\pi^2}{9\cdot 2} =$$

$$= \frac{8\pi G}{c^2}\cdot\frac{M_P\alpha_e\cdot}{\frac{4}{3}\pi l^3}\frac{M_PG}{18}\frac{32\pi^2}{3} = \frac{2\cdot 8\pi G}{c^2}\cdot\frac{M_P\alpha_e\cdot}{\frac{8}{3}\pi l^3}\frac{M_бG}{\alpha_e(q)} = \frac{16\pi G}{c^2}\cdot\frac{M_P\alpha_e}{\frac{\alpha_{GU}}{\alpha_e(q)}\pi l^3}\frac{M_бG}{\alpha_e(q)} = \frac{16\pi G}{c^2}\cdot\frac{M_P\alpha_e\cdot}{\alpha_{GU}\pi l^3}M_бG \tag{17d}$$

Where: $\frac{(P\alpha_{GU})^2}{(ct_H)^2} = \frac{(P\alpha_{GU})^2}{\frac{9}{16\pi}(P\alpha_{GU})^2} = \frac{16\pi}{9}$

Let's continue the transformation using the formula for the 3-dimensional gravitational volume (11a):

$$\ddot{l} = \frac{d\dot{l}}{d\tau} = \frac{16\pi G}{c^2}\cdot\frac{M_P\alpha_e\cdot}{\alpha_{GU}\pi l^3}M_бG = \frac{16\pi G}{c^2}\cdot\frac{M_P\alpha_e}{\alpha_{GU}\pi\frac{9}{2}M_бGt_б^2}M_бG = \frac{16\pi G}{c^2}\cdot\frac{2M_P\alpha_e}{9\alpha_{GU}\pi t_б^2} = \frac{32\pi G}{3c^2}\cdot\frac{M_P\alpha_e}{3\alpha_{GU}\pi t_б^2} =$$

$$= \frac{32\pi^2}{3}\cdot\frac{M_P\alpha_eG}{3\alpha_{GU}\pi^2t_б^2c^2} = \frac{1}{\alpha_e(q)}\cdot\frac{M_P\alpha_eG}{3\alpha_{GU}\pi^2t_б^2c^2} = \frac{P\alpha_e}{\alpha_{GU}3\pi^2\alpha_e(q)}\cdot\frac{1}{t_б^2} = \frac{P\alpha_e}{\frac{\alpha_{GU}\alpha_e(q)}{\alpha_W(q)}}\cdot\frac{1}{t_б^2} = \frac{P\alpha_e}{\phi\alpha_et_б^2} = \frac{P}{\phi t_б^2} = \frac{M_PG}{\phi c^2t_б^2} = \frac{M_PG}{(\sqrt{\phi}c)^2t_б^2}$$

Where: $\frac{\alpha_{GU}\alpha_e(q)}{\alpha_W(q)} = \frac{1}{4\pi^2}\cdot\frac{3}{32\pi^2}3\pi^2 = \frac{1}{4\pi^2}\cdot\frac{9}{32} = \frac{9}{128\pi^2} = \frac{9\alpha_e}{128\pi^2\alpha_e} = \phi\alpha_e$

The resulting formula yields an inverse relationship:

$$(\phi c)^2t_б^2 = \frac{M_PG}{\ddot{l}} \tag{18a}$$

Let's apply it to the formula for the 3-dimensional gravitational volume (11a), writing it as follows:

$$l^3 = \frac{P_{т.м.}}{\phi}\cdot\phi c^2t_б^2 = \frac{P_{т.м.}}{\phi}\cdot\frac{M_PG}{\ddot{l}} \tag{18b}$$

Expressing acceleration from it, we arrive at an equation that describes its effect on the coordinates of three-dimensional time, taking into account (13):

$$\ddot{l} = \frac{P_{т.м.}}{\phi}\cdot\frac{M_PG}{l^3} = \frac{9}{2}\frac{P_б}{\phi}\cdot\frac{M_PG}{l^3} = \frac{9}{2}\frac{P_бc^2}{\phi}\cdot\frac{M_PG}{c^2l^3} = \frac{9}{2}\frac{P_бc^2}{\phi}\cdot\frac{P}{l^3} = \frac{9}{2}\frac{P_бc^2}{\phi}\frac{P}{P}\cdot\frac{P}{l^3} =$$

$$= \frac{9}{2}\frac{P_бc^2}{P}\cdot\frac{P^2}{\phi l^3} = \frac{9}{2}\frac{P_бc^2}{P}\cdot\frac{1}{\frac{l^3}{\frac{P^2}{\phi}}} = \frac{9}{2}\frac{P_бc^2}{P}\frac{1}{\tilde{l}} = \frac{P_{т.м}c^2}{P}\frac{1}{\tilde{l}} = \frac{M_{т.м}Gc^2}{c^2\frac{M_PG}{c^2}}\frac{1}{\tilde{l}} = \frac{M_{т.м}c^2}{M_P}\frac{1}{\tilde{l}}$$

The resulting formula for positive acceleration acts on the mass of the graviton vacuum, creating a force acting on the geometry of 3-dimensional time.

$$M_P\ddot{l} = \frac{M_{т.м}c^2}{\tilde{l}} = \frac{M_{т.м}c^2}{\frac{l^3}{\frac{P^2}{\phi}}} = \frac{M_{т.м}c^2}{l^3}\frac{P^2}{\phi} = \frac{M_{т.м}c^2}{\frac{v_{б.х.в.}^2t_б^2}{ct_H}} = \frac{M_{т.м}c^2\cdot ct_H}{v_{б.х.в.}^2t_б^2} = \frac{M_{т.м}\cdot M_HG}{v_{б.х.в.}^2t_б^2} \tag{18c}$$

From the resulting acceleration formula, it is clear that baryonic matter, as "an objective reality independent of our consciousness and given to us through sensation," does not participate in antigravitational interactions. It is hidden from an external observer within dark matter, which interacts with mass belonging to the Hubble vacuum.

Let's apply the resulting formula (18a) to determine the spatial limiting radius of some hyperreality expanding with acceleration. Let's write it in reverse form:

$$\ddot{l} = \frac{d\dot{l}}{d\tau} = \frac{M_P G}{\phi c^2 t_б^2} = \frac{M_P G}{\phi}\frac{P_{т.м}}{l^3} = \frac{4}{3}\pi\frac{M_P G}{\frac{4}{3}\pi l^3}\frac{P_{т.м}}{\phi} = \frac{4}{3}\pi G(\frac{M_P}{\frac{4}{3}\pi l^3})\frac{P_{т.м}}{\phi} \quad (19a)$$

We choose the gravitational radius of the mass M_p, equal to the graviton wavelength P = l, as the limiting radius. Then the density of the mass M_p enclosed in a 3-dimensional sphere will be:

$$\rho_p = \frac{M_P}{\frac{4}{3}\pi P^3} = \frac{M_P c^2}{\frac{4}{3}\pi P^2 M_P G} = \frac{c^2}{\frac{4}{3}\pi P^2 G} = \frac{(3\cdot 10^{10})^2}{\frac{4}{3}\pi\cdot 6,672\cdot 10^{-8}(1,18964666\cdot 10^{30})^2} = 0,22754216310^{-32}\, g/cm^3$$

The acceleration formula will look like this:

$$\ddot{l} = \frac{4}{3}\pi G(\frac{M_P}{\frac{4}{3}\pi P^3})\frac{P_{т.м}}{\phi} = \frac{4}{3}\frac{\pi G\rho_p c}{c^2}\cdot\frac{P_{т.м}}{\phi} = \frac{\Lambda_{VP}c^2}{3}\frac{P_{т.м}}{\phi} \quad (19b)$$

Where:

$$\Lambda_{VP} = \frac{4\pi G\rho_p}{3c^2} = \frac{4\pi G\rho_p}{3c^2} = \frac{4\pi}{3}\frac{6,672\cdot 10^{-8}\cdot 0,227542163\cdot 10^{-32}}{(3\cdot 10^{10})^2} = 0,70658435910^{-60}\, cm^{-2}$$

is the cosmological constant of the graviton vacuum.

Let's show that the cosmological constant is included in the angular velocity formula.

$$\frac{\Lambda_{VP}c^2}{3} = \frac{4\pi G\rho_p}{3c^2}c^2 = \frac{4\pi G}{c^2}\frac{c^4}{\frac{4}{3}\pi P^2 G} = \frac{4\pi G}{3c^2}\frac{c^4}{\frac{4}{3}\pi P^2 G} = \frac{c^2}{P^2} = \Omega_P^2$$

Where: $\Omega_P = \frac{c}{P}$ - angular velocity.

Then the acceleration can be written as:

$$\ddot{l} = \frac{d\dot{l}}{d\tau} = \frac{\Lambda_{VP}c^2}{3} = \Omega_P^2\frac{P_{т.м}}{\phi}$$

Let's show that the acceleration formula we found is the acceleration for a helical line. To do this, we write its second half as:

$$\Omega_P^2\frac{P_{т.м}}{\phi} = \frac{c^2}{P^2}\frac{P_{т.м}}{\phi} = \frac{c^2}{\frac{\phi P^2}{P_{т.м}}} = \frac{c^2}{\rho_{в.л.}} \quad (19c)$$

Where: $\rho_{в.л.} = \frac{\phi P^2}{P_{т.м}} = \frac{\phi P^2}{\frac{P\alpha_{GU}}{4}} = \frac{4\phi P}{\alpha_{GU}}$ is the radius of curvature of a helical line; $v_{абс} = c$ is an absolute speed of movement;

$R_ц = \frac{P_{т.м}}{\phi} = \frac{P\alpha_{GU}}{4\phi}$ is the radius of the cylinder.

We find the square of the sine of the angle of inclination of the radius of curvature:

$$\sin^2\gamma = \frac{R_ц}{\rho_{в.л.}} = \frac{P_{т.м}}{\phi\frac{\phi P^2}{P_{т.м}}} = \frac{P_{т.м}^2}{\phi^2 P^2}$$

Where $\sin\gamma = \frac{P_{т.м}}{\phi P} = \frac{P\alpha_{GU}}{4\phi P} = \frac{\alpha_{GU}}{4\phi} = \frac{1}{16\pi^2\phi} = 6,486535574\cdot 10^{-3}:\ \gamma = 0,371653718°$

Thus, hyperreality should be understood as a helical motion arising from the action of fields inherent in its nature by the flows of time.

We will show that baryon time in a 3-dimensional volume is related to the radius of curvature and the angular velocity in the helical line.

To do this, we write the formula for acceleration as an equation:

$$\ddot{l} = \Omega_P^2 R_ц = \frac{c^2}{\rho_{в.л.}} = \frac{P}{\phi t_б^2}$$

From this we find two expressions for $t_á^2$

$$c^2 t_б^2 = \rho_{в.л.}\frac{P}{\phi} = \frac{\phi P^2}{P_{т.м}}\frac{P}{\phi} = \frac{P^3}{P_{т.м}}$$

$$c^2 t_б^2 = c^2\frac{P}{\Omega_P^2 R_ц\phi} = c^2\frac{P}{\frac{c^2}{P^2}\frac{P_{т.м}}{\phi}\phi} = \frac{P^3}{P_{т.м}}$$

As we see, in both cases we arrive at the same formula for a 3-dimensional volume, filled in one case with dark matter, which is balanced in the second case by baryonic matter:

$$l^3 = P^3 = P_{т.м}c^2 t_{б\max}^2 = \frac{9}{2}M_б G t_{б\max}^2$$

The accepted value of the spatial radius $l = P$ corresponds to the radius of the hyperspace containing both time streams. Hyperspace is generally described by a polar equation (see[1]).

$$2ct = ct' = \frac{P}{\sin^2\alpha}$$

Where: ct' - the polar radius is a time vector of duration consisting of two half-periods.

As follows from the resulting formulas, helical motion arises alongside a three-dimensional vacuum sphere with radius . It is directed along the proper time axis and is a spiral-shaped fourth dimension of space. It should be viewed as a temporal flow, the acceleration of which affects all processes within it.

The space-time model considered exists within a 5-dimensional sphere and is not the only possible one. Along with it, a Hubble vacuum emerges, influenced by the shape of the 5-dimensional sphere. The force equilibrium equation in such a vacuum is described by (14f). It shows that the total energy of such a vacuum is distributed over a 3-dimensional volume. We will demonstrate that it is precisely within this 3-dimensional volume that our Metagalaxy can exist.

Since the acceleration found (19a) is a universal equation for describing vacuum hyperreality, we will apply it to this type of vacuum. We will write it as follows:

$$\ddot{l} = \frac{d\dot{l}}{d\tau} = \frac{M_P G}{\phi c^2 t_б^2} = \frac{M_P\alpha_{GU}G}{\alpha_{GU}\phi}\frac{P_{т.м}}{l^3} = \frac{4}{3}\pi G\left(\frac{M_P\alpha_{GU}}{\frac{4}{3}\pi l^3}\right)\frac{P_{т.м}}{\alpha_{GU}\phi} \quad (20a)$$

We choose the gravitational radius $l = P\alpha_{GU}$ of the mass $M_P\alpha_{GU}$ as the limiting radius. Then the density of the mass $M_P\alpha_{GU}$ enclosed in a 3-dimensional vacuum sphere will be:

$$\rho_V = \frac{M_P\alpha_{GU}}{\frac{4}{3}\pi(\alpha_{GU}P)^3} = \frac{c^2}{\frac{4}{3}\pi(\alpha_{GU}P)^2 G} = \frac{(3\cdot 10^{10})^2}{\frac{4}{3}\pi\cdot 6,672\cdot 10^{-8}\left(\frac{1,18964666\cdot 10^{30}}{4\pi^2}\right)^2} = 3,546348043\cdot 10^{-30}\, g/cm^3$$

The resulting vacuum density value corresponds to observational data on supernovae, which is[4,p.127]:

$$\rho_V = (4 \pm 0,3) \cdot 10^{-30} g / cm^3$$

Taking into account the found density, the acceleration in the new vacuum will take the form:

$$\ddot{l} = \frac{4}{3}\pi G(\frac{M_P \alpha_{GU}}{\frac{4}{3}\pi(\alpha_{GU}P)^3})\frac{P_{т.м}}{\alpha_{GU}\phi} = \frac{4}{3}\frac{\pi G \rho_V c}{c^2} \cdot \frac{P_{т.м}}{\alpha_{GU}\phi} = \frac{\Lambda_V c^2}{3}\frac{P_{т.м}}{\alpha_{GU}\phi} \quad (20b)$$

Where: $\Lambda_V = \frac{4\pi G\rho_V}{3c^2} = \frac{4\pi G\rho_V}{3c^2} = \frac{4\pi}{3}\frac{6,672 \cdot 10^{-8} \cdot 3,546348043 \cdot 10^{-30}}{(3 \cdot 10^{10})^2} = 1,101243842 \cdot 10^{-57} cm^{-2}$ is a cosmological constant of the new vacuum.

Let's show that the cosmological constant is included in the angular velocity formula.

$$\frac{\Lambda_V c^2}{3} = \frac{4\pi G \rho_V}{3c^2}c^2 = \frac{4\pi G}{c^2}\frac{c^4}{\frac{4}{3}\pi(\alpha_{GU}P)^2 G} = \frac{4\pi G}{3c^2}\frac{c^4}{\frac{4}{3}\pi(\alpha_{GU}P)^2 G} = \frac{c^2}{(\alpha_{GU}P)^2} = \Omega_V^2$$

Where: $\Omega_V = \frac{c}{\alpha_{GU}P}$ is the angular velocity that occurs in a vacuum.

Then the acceleration can be written as:

$$\ddot{l} = \frac{d\dot{l}}{d\tau} = \frac{dv}{d\tau} = \frac{\Lambda_V c^2}{3}\frac{P_{т.м}}{\alpha_{GU}\phi} = \Omega_V^2 \Re_V = \frac{u_{ц.б}^2}{\Re_V} \quad (20c)$$

Where: $\Re_V = \frac{P_{т.м}}{\alpha_{GU}\phi} = \frac{P\alpha_{GU}}{4(\alpha_{GU}\phi)} = \frac{P}{4\phi} > R_ц = \frac{P\alpha_{GU}}{4\phi}$ - radius of a circle;

$u_{ц.б} = \Omega_V \Re_V$ - centrifugal velocity.

We equate it to the term containing the baryon time:

$$\ddot{l} = \frac{d\dot{l}}{d\tau} = \Omega_V^2 \Re_V = \frac{c^2}{(\alpha_{GU}P)^2} \cdot \frac{P_{т.м}}{\alpha_{GU}\phi} = \frac{P\alpha_{GU}}{\alpha_{GU}\phi t_б^2} \quad (20d)$$

From the resulting equation, we find the final value of the baryon time in the new vacuum:

$$t_{б\max} = \sqrt{\frac{(\alpha_{GU}P)^3}{c^2 P_{т.м}}} = \sqrt{\frac{(\alpha_{GU}P)^3}{c^2 P\alpha_{GU}}4} = \sqrt{\frac{4(\alpha_{GU}P)^2}{c^2}} = \frac{2(\alpha_{GU}P)}{c} = \frac{2(\alpha_{GU}P)\frac{3}{4\sqrt{\pi}}}{c}\frac{4\sqrt{\pi}}{3} = \frac{8\sqrt{\pi}}{3}t_H = 4,726543602 t_H$$

The maximum lifetime of the Metagalaxy in such a vacuum is:

$$t_{б\max} = \frac{2(\alpha_{GU}P)}{c} = 4,726543602 t_H = 4,726543602 \cdot 13,4535498 = 63,58878973 billion.years \quad (20e)$$

A 3-dimensional volume has the form:

$$l_{\max}^3 = (\alpha_{GU}P)^3 = \frac{9}{2}M_б G t_{б\max}^2 \quad (21)$$

As we can see, the radius of the 3-dimensional volume is equal to the gravitational radius of the vacuum mass, which limits the lifetime of the Metagalaxy with the specified properties.

We will associate the resulting volume and baryon time with the new time flow that formed in the new vacuum. We will consider the mechanism of its formation from the perspective of time theory. We will consider the helical motion (19 s) as a direct time flow. In this flow, the incident vector $\widehat{t}$ is aligned with the proper time axis $\widehat{\tau}$. The length of the incident vector measures the path traveled by the flow in seconds, multiplied by the speed of light.

A barrier appears in its path in the form of a spatial circle of radius $\Re_V$, in which the angular velocity Ω_V differs from the angular velocity in the helical path under consideration.

This is the cause of the barrier's formation. The helical flow generated by the incident vector $\widehat{t}$, cannot penetrate the barrier and is reflected from it, forming a left-hand parabolic surface.

The conclusion follows from the tangential equation of time[5], which has the form:

$$\widehat{t} = \sqrt{\widehat{\tau}^2 + \psi^2} = \widehat{\tau} + \psi\dot{\psi} = \widehat{\tau} + \theta_0 \quad (22a)$$

Where: $\dot{\psi} = \frac{d\psi}{d\widehat{t}}$ is a direct tempo of time; θ_0 - the length of the duration vector in seconds it existed before encountering the barrier.

When deriving the equation, a postulate in the form of a unit derivative was used:

$$\frac{d\widehat{\tau}}{d\widehat{t}} = 1 \quad (22b)$$

It follows from this, under zero initial conditions, that $\widehat{t} = \widehat{\tau}$, i.e.coincides with the axis in direction. But at some point, the flow encounters a barrier, which corresponds to the length of the vector traveled, equal to θ_0.

The right-hand side of the equation follows from integrating (22b) under the initial conditions $\widehat{t}(0) = \theta_0$ $\widehat{\tau}(0) = 0$. Solving the equations simultaneously, we arrive at a function describing the left-hand parabola:

$$\widehat{\tau} = \frac{\psi^2}{2\theta_0} - \frac{\theta_0}{2}$$

Multiplying both sides by the speed of light, we obtain the metric form of the left-reflected helical flow in time $\widehat{t}$.

$$\tilde{s} = \frac{l^2}{2A} - \frac{A}{2} \quad (22c)$$

In the formula: $A = c\theta_0$ is the length of the incident vector at the moment it hits the barrier.

The focus of the parabola is at the center of the transverse circle that impedes the helical flow. In polar form, the parabola equation is:

$$c\widehat{t} = \frac{A}{1-\cos\varphi} \quad (22d)$$

After the flow is reflected from the barrier to the left in time of the incident vector, a parabolic direct flow arises in the right part of the vector in time of duration. The conclusion follows from the relationship between the duration vector and the incident vector through the polar formula[1]:

$$ct = 2c\widehat{t}\cos\alpha \quad (22e)$$

Where: $\alpha = \frac{\varphi}{2}$ - angle of inclination of the duration vector.

We transform the polar equation (22d) through the angle corner α.

$$c\widehat{t} = \frac{A}{1-\cos\varphi} = \frac{A}{2\sin^2\alpha}$$

Applying formula (22e), we arrive at the equation of the parabola in polar form:

$$ct = 2c\widehat{t}\cos\alpha = \frac{A\cos\alpha}{\sin^2\alpha}$$

In rectangular coordinates the equation will take the form:

$$c\tau' = s' = \frac{l^2}{c\theta_0} = \frac{l^2}{A} \quad (22f)$$

Where: τ' - new time flow of duration time.

The constant acceleration value found (20 s) is not the acceleration in a helical line. It arises as centrifugal acceleration during rotation around a circle. The circle acts as a barrier to the helical flow, which, upon encountering it, splits into two parts existing at different times. We will be interested in the left part, representing the new time flow τ'.

Let's consider its effect on centrifugal acceleration, which has a constant value. To do this, we solve differential equation (20d). We perform the integration under zero initial conditions, which signifies a transition to a different time flow τ'. As a result, we find the velocity function in the form:

$$v = \frac{dl}{d\tau} = \Omega_V^2 \Re_V \tau' \qquad (23a)$$

Where: $\Omega_V^2 \Re_V = \frac{c^2}{(\alpha_{GU} P)^2} \cdot \frac{P_{т.м}}{\alpha_{GU}\phi} = \frac{c^2}{(\alpha_{GU} P)^2} \cdot \frac{\alpha_{GU} P}{4\alpha_{GU}\phi} = \frac{c^2}{(\alpha_{GU} P)} \cdot \frac{1}{4\alpha_{GU}\phi} = \frac{c^2}{4\alpha_{GU}^2 \phi P}$

We find l for the same time τ':

$$l = \Omega_V^2 \Re_V \frac{\tau'^2}{2} = \frac{c^2 \tau'^2}{2 \cdot 4\phi(\alpha_{GU})^2 P} = \frac{s'^2}{2 \cdot p} \qquad (23b)$$

Where: $p = \frac{1}{\Omega_V^2 \Re_V} = 4\phi(\alpha_{GU})^2 P$ is a parameter of the new parabola.

Applying the new flow function (22f), we arrive at a solution in the form:

$$l = \frac{s'^2}{2p} = \frac{l^4}{2p \cdot A^2}$$

By reducing by l, we arrive at a constant value of the 3-dimensional volume:

$$l^3 = 2p \cdot A^2 \qquad (24a)$$

Its value must coincide with the volume (21). By equating, we obtain the equation:

$$l_{\max}^3 = (\alpha_{GU} P)^3 = \frac{9}{2} M_б G t_{б\max}^2 = 2p \cdot A^2 \qquad (24b)$$

The further solution depends on which of the parameters p or A can be expressed in terms of the baryon mass. Obviously, it must be expressed in terms of the parameter p, which arises when solving the acceleration equation.

$$p = a \cdot P_б = a \frac{M_б G}{c^2}$$

Where

$$a = \frac{p}{P_б} = \frac{4\phi(\alpha_{GU})^2 P}{P_б} = \frac{4\phi\alpha_{GU}(\alpha_{GU} P)}{P_б} = 18 \frac{4\phi\alpha_{GU}}{P_б} \cdot \frac{(\alpha_{GU} P)}{18} = 18 \frac{4\phi\alpha_{GU}}{P_б} \cdot P_б = 72\phi\alpha_{GU} = \frac{72}{4\pi^2}\phi = 1,780492822$$

Equating (24b), we obtain the equation:

$$\frac{9}{2} M_б G t_{б\max}^2 = 2p \cdot A^2 = 2a \frac{M_б G}{c^2} \cdot A^2$$

We find

$$t_{б\max} = \sqrt{\frac{4}{9} \frac{A^2 a}{c^2}} = \frac{2}{3} \frac{A}{c} \sqrt{a}$$

To find it A, we equate it to the baryon time (20e):

$$t_б = \frac{2}{3}\frac{A}{c}\sqrt{a} = \frac{2(\alpha_{GU}P)}{c}$$

Where:

$$A = \frac{3ct_б}{2\sqrt{a}} = \frac{3(\alpha_{GU}P)}{\sqrt{a}} = \frac{3(\alpha_{GU}P)}{\sqrt{1,780492822}} = \frac{3(\alpha_{GU}P)}{1,334351086} = 2,248283852P\alpha_{GU} = 0,056949695P \quad (24b)$$

The formula shows that all time in length has been converted into baryon time, exceeding it by 1.12 times.

5. The End of the Era of Radiation and the Transition to the Stage of Matter

So, we've reached the most important point the formation of matter from baryonic mass. The Big Bang theory relies on the Friedmann equation, which derives the radiation energy density. By equating it to the formula from the thermodynamics of blackbody radiation, we can find the temperature, which changes over time, of the radiation. An analysis of this formula allows us to predict the temperature of relic photons with an accuracy of up to an order of magnitude. This is the theory's strength, and we won't neglect it. We use the radiation energy density in our theory. It is included in the formula for antigravitational acceleration (17c), which we represent as:

$$\ddot{l} = -\frac{8\pi Gl}{3c^2}\varepsilon_5(\tau) = \frac{8\pi Gl}{3c^2}\frac{3c^2}{32\pi G\tau^2} \quad (25a)$$

In this equation, proper time plays the role of radiation time.

The equation is transformed to the form (17d) and can be further transformed taking into account that we are considering the density of baryonic matter contained in a 3-dimensional ball:

$$\ddot{l} = \frac{d\dot{l}}{d\hat{t}_{5u}} = \frac{16\pi G}{c^2}\cdot\frac{M_P\alpha_e\cdot}{\alpha_{GU}\pi l^3}M_б G = \frac{8\pi G}{c^2}\cdot\frac{8}{3}\frac{M_P\alpha_e}{\alpha_{GU}}(\frac{M_б}{\frac{4}{3}\pi l^3})G = \frac{8\pi G}{c^2}\frac{\alpha_{GU}}{\alpha_e(q)}\frac{M_P\alpha_e}{\alpha_{GU}}\cdot\rho_б(l)G = \frac{8\pi G}{c^2}\rho_б(l)\cdot\frac{M_P\alpha_e\cdot G}{\alpha_e(q)} \quad (25b)$$

Where: $\rho_б(l) = \frac{M_P}{\frac{4}{3}\pi l^3}$ is the density of baryonic matter.

We assume that the process of matter formation occurs at the gravitational radius for the baryonic mass, i.e., at $l = P_б$. Then we have a constant value on the right-hand side, which corresponds to a constant left-hand side, in which time is $\tau = t_{u\max} = const$.

Let's consider the formula for the constant density of baryonic matter in a sphere with a gravitational radius. In this sphere, processes related to the mass of baryonic matter occur, which, at the moment of formation, is a substance consisting of a field structure of elementons. The mass belongs to the baryonic volume, in which baryonic time has a course expressed in terms of velocity $v_{б.х.в.}$ (see (8b)). The velocity formula yields the relation:

$$\frac{v_{б.х.в.}}{c} = \frac{\phi}{2\pi}\sqrt{\frac{\alpha_e}{6\pi\sqrt{\pi}}}$$

It includes interaction constants that determine the future structure of matter. These constants act on the baryon mass and cause fields to appear within it. To account for them, we consider formula (8c).

$$-\frac{s^2}{t_б^2}\cdot\frac{1}{l} = \frac{\phi c^2}{P^2}\cdot P_{т.м.} = \frac{v_{б.х.в.}^2}{ct_H}$$

From it we find the square of the speed of light:

$$c^2 = \frac{P^2}{\phi P_{т.м.}}\frac{v_{б.х.в.}^2}{ct_H}$$

We substitute into the formula for the gravitational radius and take into account the ratio of the velocities

$$P_б = \frac{M_б G}{c^2} = \frac{M_б G}{\frac{P^2}{\phi P_{т.м.}} \frac{v_{б.х.в.}^2}{ct_H}} = \frac{M_б}{\frac{P^2}{\phi P_{т.м.}} \frac{v_{б.х.в.}^2}{ct_H} \cdot \frac{v_{б.х.в.}}{c}} \frac{v_{б.х.в.}}{c} G = \frac{M_б \frac{v_{б.х.в.}}{c} G}{\frac{P^2}{\phi P_{т.м.}} \frac{(v_{б.х.в.})^3}{ct_H c}} = M_б \frac{v_{б.х.в.}}{c} \frac{G}{c^2} \cdot \frac{\phi P_{т.м.} ct_H c^3}{P^2 (v_{б.х.в.})^3} =$$

$$= M_б \frac{v_{б.х.в.}}{c} \frac{G}{c^2} \cdot \frac{\phi P \alpha_{GU} ct_H c^3}{4P^2 (v_{б.х.в.})^3} = M_б \frac{v_{б.х.в.}}{4c} \frac{G}{c^2} \cdot \frac{\phi P \alpha_{GU} ct_H c^3}{P^2 (v_{б.х.в.})^3} = (M_б \frac{v_{б.х.в.}}{4c} \frac{G}{c^2}) \cdot (\frac{\phi \alpha_{GU} ct_H}{P} \frac{c^3}{(v_{б.х.в.})^3}) \quad (25b)$$

We introduce the designation:

$P_d^{\min} = M_б \frac{v_{б.х.в.}}{4c} \frac{G}{c^2}$ - the minimum gravitational radius of a domain filled with baryonic mass.

$n_d^{\max} = \frac{\phi \alpha_{GU} ct_H}{P} \frac{c^3}{(v_{б.х.в.})^3}$ - the maximum number of domains that fit within the gravitational radius of the baryonic mass.

Let us determine the numerical value of the number of domains.

$$n_d^{\max} = \frac{\phi \alpha_{GU} ct_H}{P} \frac{c^3}{(v_{б.х.в.})^3} = \frac{\phi \alpha_{GU} \frac{3}{4\sqrt{\pi}} P \alpha_{GU}}{P} \frac{c^3}{(v_{б.х.в.})^3} = \phi \frac{3}{4\sqrt{\pi}} \alpha_{GU}^2 \frac{c^3}{(v_{б.х.в.})^3} = \phi \frac{3}{4\sqrt{\pi}} \frac{c^3}{16\pi^4 (v_{б.х.в.})^3} = -$$

$$= \phi \frac{3}{\sqrt{\pi}} \frac{c^3}{64\pi^4 (v_{б.х.в.})^3} = \frac{2,650539748 \cdot 10^{-4}}{(2,296318939 \cdot 10^{-3})^3} = 0,2188959359 \cdot 10^5 = 21889,59359$$

Thus, we can write

$$P_б = \frac{M_б G}{c^2} = P_d^{\min} \cdot n_d^{\max} = M_б \frac{v_{б.х.в.}}{4c} \frac{G}{c^2} \cdot n_d^{\max}$$

Where:

$M_б \frac{v_{б.х.в.}}{4c} = M_{б.d} = \frac{M_б}{n_{об}^{\max}}$ - baryon mass contained in one domain.

From the resulting equality follows the moment of conservation of momentum arising from the contact of the baryon mass with the passage of time:

$$M_б \frac{v_{б.х.в.}}{4} = M_б v_{б.х.в.} \cdot \cos 2\alpha_W = M_{б.d} c$$

Where: $\cos 2\alpha_W = 1/4$ is the cosine of the double Weinberg angle for GUF.

Let us check the cosine formula:

$$\cos 2\alpha_W = 1 - 2\sin^2 \alpha_W = 1 - 2 \cdot \frac{3}{8} = 1 - \frac{3}{4} = \frac{1}{4}$$

Thus, the baryon mass is affected by the projection of the flow of time onto the (TIR). This projection leads to the emergence of regions with reduced baryon mass. These regions form three-dimensional gravitational domains in four-dimensional space, independent of the radiation time but dependent on the baryon time. Their characteristic feature is the recombination of particles into ready-made hydrogen atoms. To determine the proper time at which this separation occurred, we continue to study the acceleration equation. Since the baryonic mass is considered in a three-dimensional volume with a gravitational radius relative to this mass, the baryonic mass density introduced above assumes a constant value $\rho_{0á}$ and is transformed to the form:

$$\rho_{0б} = \frac{M_б}{\frac{4}{3}\pi P_б^3} = \frac{M_б}{\frac{4}{3}\pi P_б^2 (\frac{M_б G}{c^2})} = \frac{c^2}{\frac{4}{3}\pi P_б^2 \cdot G}$$

Let us express it through the density of one domain and their number.

$$\rho_{0б} = \frac{M_б}{\frac{4}{3}\pi P_б^3} = \frac{M_б \frac{v_{б.х.в.}}{4c} \cdot n_{яч}^{\max}}{\frac{4}{3}\pi (P_d^{\min} \cdot n_d^{\max})^3} = \frac{M_б \frac{v_{б.х.в.}}{4c}}{\frac{4}{3}\pi (P_d^{\min})^3 \cdot (n_d^{\max})^2}$$

Let's move on to the density of one domain. To do this, we multiply the total density by $(n_d^{\max})^2$:

$$\rho_{d.б} = \rho_{0б} \cdot (n_d^{\max})^2 = \frac{M_б \frac{v_{б.х.в.}}{4c}}{\frac{4}{3}\pi (P_d^{\min})^3} = \frac{M_б \frac{v_{б.х.в.}}{4c}}{\frac{4}{3}\pi (P_d^{\min})^2 \cdot M_б \frac{v_{б.х.в.}}{4c}\frac{G}{c^2}} = \frac{c^2}{\frac{4}{3}\pi (P_d^{\min})^2 \cdot G}$$

We will consider further formulas relative to the unit domain. Then the acceleration formula (25b) will take the form:

$$\ddot{l} = \frac{8\pi G}{c^2}\rho_{0б} \cdot \frac{M_P \alpha_e \cdot G}{\alpha_e(q)} = \frac{8\pi G}{c^2}\rho_{0б}(n_d^{\max})^2 \cdot \frac{M_P \alpha_e \cdot G}{\alpha_e(q)(n_d^{\max})^2}$$

Let us express it through the cosmological constant that arises in one domain.

$$\ddot{l} = \frac{d\dot{l}}{d\tau} = \frac{8\pi G \rho_{0б}(n_d^{\max})^2 c^2}{c^2} \cdot \frac{M_P \alpha_e G}{\alpha_e(q)(n_d^{\max})^2 c^2} = \Lambda_d c^2 l_{0V} \quad (25c)$$

Where

$\Lambda_d = \frac{8\pi G \rho_{0б}(n_d^{\max})^2}{c^2}$ - cosmological constant arising in the domain.

$\frac{M_P \alpha_e G}{\alpha_e(q)(n_d^{\max})^2 c^2} = l_{0V}$ - gravitational radius of the vacuum mass.

Let's define $\Lambda_d c^2$:

$$\Lambda_d c^2 = \frac{8\pi G \rho_{0б}(n_d^{\max})^2}{c^2} c^2 = 8\pi G \rho_{0б}(n_d^{\max})^2 = 8\pi G \frac{c^2}{\frac{4}{3}\pi (P_d^{\min})^2 G} = 8\frac{c^2}{\frac{4}{3}(P_d^{\min})^2} = \frac{6c^2}{(P_d^{\min})^2} = \Omega^2$$

Thus, we arrived at an expression for the square of the angular velocity arising in the domain.

Taking this into account, the equation for acceleration will take the form

$$\ddot{l} = \frac{d\dot{l}}{d\hat{t}_{5u}} = \frac{d^2 l}{d\tau^2} = \Lambda_d c^2 l_{0V} = \Omega^2 l_{0V} \quad (25d)$$

We apply the acceleration equation (25a), expressed in terms of the radiation energy density, and equate it to (25d):

$$\ddot{l} = -\frac{8\pi G l}{3c^2}\varepsilon_5(\tau) = \frac{8\pi G l}{3c^2}\left(\frac{3c^2}{32\pi G \tau^2}\right) = \Lambda_d c^2 l_{0V}$$

We extract from it the value of the expression in brackets:

$$\left(\frac{3c^2}{32\pi G \tau^2}\right) = \frac{3c^2}{8\pi G l}\Lambda c^2 l_{0V} = \frac{3 l_{0V} c^2}{8\pi G l} 8\pi G \rho_{0б}(n_d^{\max})^2 = \frac{3 l_{0V}}{l}\rho_{0б}(n_d^{\max})^2 c^2 = \frac{3 l_{0V}}{P_d^{\min}}\rho_{0б}(n_d^{\max})^2 c^2$$

Here the radius of the domain is taken as $l = P_d^{\min}$

We find the ratio:

$$\frac{3 l_{0V}}{P_d^{\min}} = \frac{3 M_P \alpha_e G}{\alpha_e(q)(n_d^{\max})^2 c^2 M_б \frac{v_{б.х.в.}}{4c}\frac{G}{c^2}} = \frac{3 M_P \alpha_e}{\alpha_e(q)(n_d^{\max})^2 M_б \frac{v_{б.х.в.}}{4c}} = \frac{3 M_P \alpha_e}{\alpha_e(q)(n_d^{\max})^2 \frac{M_P \alpha_{GU}}{18}\frac{v_{б.х.в.}}{4c}} = \frac{54\alpha_e}{\alpha_e(q)(n_d^{\max})^2 \alpha_{GU}\frac{v_{б.х.в.}}{4c}}$$

Substituting into the equation, we obtain:

$$(\frac{3c^2}{32\pi G\tau^2}) = \frac{3l_{0V}}{P_d^{\min}}\rho_{0б}(n_d^{\max})^2 c^2 = \frac{54\alpha_e}{\alpha_e(q)(n_d^{\max})^2\alpha_{GU}\frac{v_{б.х.в.}}{4c}}\rho_{0б}(n_d^{\max})^2 c^2 = \frac{216\alpha_e}{\alpha_e(q)\alpha_{GU}}\cdot\frac{c}{v_{б.х.в.}}\rho_{0б}c^2$$

We find the radiation time.

$$\tau_{\max}{}^2 = t_{и\max}^2 = \frac{3c^2}{32\pi G\frac{216\alpha_e}{\alpha_e(q)\alpha_{GU}}\frac{c}{v_{б.х.в.}}\rho_{0б}c^2} = \frac{\alpha_e(q)\alpha_{GU}v_{б.х.в.}}{32\pi G\cdot 72\alpha_e c\rho_{0б}} = \frac{\alpha_e(q)\alpha_{GU}v_{б.х.в.}}{32\pi G\cdot 72\alpha_e c\frac{c^2}{\frac{4}{3}\pi P_б^2\cdot G}} =$$

$$= \frac{P_б^2}{73728\pi^4\alpha_e}\frac{v_{б.х.в.}}{c^3} = 1{,}908107021\cdot 10^{-5}\cdot\frac{2{,}296318939\cdot 10^{-3}}{c^2}P_б^2 = 4{,}381622289\cdot 10^{-8}\frac{P_б^2}{c^2}$$

We find the maximum radiation time $t_{и\max}$ in years:

$$t_{и\max} = \sqrt{4{,}381622289\cdot 10^{-8}\frac{P_б^2}{c^2}} = 2{,}093232498\cdot 10^{-4}\frac{P_б}{c} = \frac{2{,}093232489\cdot 10^{-4}}{18}P\alpha_{GU} = 1{,}162906943\cdot 10^{-5}P\alpha_{GU} =$$

$$= 1{,}162906943\cdot 10^{-5}\frac{4\sqrt{\pi}}{3}\cdot\frac{3P\alpha_{GU}}{4\sqrt{\pi}c} = 2{,}748265186\cdot 10^{-5}ct_H = 2{,}748265186\cdot 10^{-5}\cdot 4{,}24552662\cdot 10^{17} =$$

$$= 1{,}166783301\cdot 10^{13}\,сек = \frac{1{,}166783301\cdot 10^{13}}{3{,}1556925\cdot 10^7} = 369739{,}2254\,years$$

The maximum emission time found indicates the appearance of domains in which recombination of hydrogen atoms has occurred. The calculated value is close to the values obtained from observational data[8], which have the form:

Recombination$(290\ 000 - 370\ 000)_{-1270}^{1090}$ at temperature $T = 4000\ K\left(0{,}4\ eV/\kappa_b\right)$

Conclusion

The author's theory of the formation of the Metagalaxy stands out from existing theories in that it predicts theoretically what in cosmology is determined through long and costly observations. This demonstrates the validity of the initial data embedded in the original equation of interacting time flows. This can serve as a guideline for the continued development of theoretical science. The author presents only the final stage of the Metagalaxy's development according to the proposed model.

But there is also an initial stage. It is associated with the formation of the hydrogen atom. Its appearance is not some probabilistic event. It is associated with the Hubble vacuum matter, which, at its formation, is at the lowest energy level, belonging to the origin of three-dimensional time. This level determines the structure of baryons in the form of the neutron and proton, as well as leptons in the form of the electron, muon, -lepton, and related neutrino species.

Baryons exist in two time scales: the time scale of the incident vector and the time scale of the duration. They have different structures in these time scales. In the time scale of the duration scale, they consist of quarks. In the time scale of the incident vector, the neutron decays via a charged boson - the carrier of the electroweak force. Given this, the Standard Model of elementary particles can be expanded and made more physically understandable if it is based on a theory of three-dimensional time.

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