Reality, Nature, Universe, Planck's constants, YRA-conception

Robert A. Yusupov[1, *]

[1] *Independent University, physics and cosmology research laboratory,*
Russky Ostrov, Vladivostok, 690090, Russia
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In the present article the unique, universal, cosmological constant of the Universe is determined. On the basis of this constant the problem of build-up of unique, natural, universal, axiomatic system of the Planck's constants is solved. In article the linear model of development of the Universe is presented. According to the conception of the author the Universe space is considered as a three-dimensional, discrete, Euclidean spatial lattice with knots and a motion of the material carriers (elementary particles or the particles transmitting interaction) is considered as a transferring between the neighbouring knots of a lattice on the loopback trajectories. In article the formulas of dependences of speed of light in vacuum, of the Newtonian constant of gravitation, of the distance between the neighbouring knots of a lattice (parameter of a spatial lattice) and of the fine-structure constant from the age of the Universe are given. Formulas of calculations of the up-to-date age and average density of the Universe and their value are given in article. The solution of a problem of a dark matter and dark energy is presented also.

I. INTRODUCTION

In the present article the author presents the conception of occurrence and development of the Universe and space structure. How it seems to the author within the limits of this conception the solution of some problems of a modern physics [1] and cosmology lies. A position of the author is the following. The Universe space is dynamic, discrete, Euclidean, a three-dimensional spatial lattice with the material knots and communications between them, being in vacuum. The elementary spatial motion is a transferring of elementary particles or the particles transmitting interaction, from a knot to the neighbouring knot. The motion is sequence of the elementary spatial motions. Transferring between knots is carried out on loopback trajectories (communications). This is the reality, the loopback reality. We consider (by default) that the motion is carried out on rectilinear trajectories from a knot to the next neighbouring knot. This is our error, illusion. Our reality is a loopback reality. All in the world are material. The Universe space, a spatial lattice, spatial knots and communications between knots, vacuum are material. All in the world is in a motion. All in the world is in a changing. All in the world is in dependence on the time. The model of development of the Universe represents the linear process in time. The growth of the mass, size and magnification of age of the Universe are going under the linear law. From age of the Universe depends the distance between neighbouring knots of a spatial lattice (lattice parameter), speed of light in vacuum, the Newtonian constant of gravitation and the fine-structure constant. There are no other con- stants in the Nature, except a unique, universal, cosmological constant of the Universe (UUCCU), cosmological frequency. This cosmological constant underlies build-up of unique, natural, universal, axiomatic system of the Planck's constants (UNUASPC). The standard system of the Planck's constants (SSPC) is presented in [2] and on site NIST [3]. In article the standard system is designated as $\{m_P, l_P, t_P\}$. System UNUASPC is designated as $\{m_Y, l_Y, t_Y\}$. In article the author uses international system of units (SI). Accuracy of the calculations made the author is based on accuracy of data NIST. In the present article following effects are presented:

1. Computation of a unique, universal, cosmological constant of the Universe (UUCCU),

2. Evaluation basic of the Planck's constants for unique, natural, universal, axiomatic system (UNUASPC), YRA-system,

3. Evaluation of geometrical parameter of a spatial lattice of the Universe (distance between the next neighbouring knots),

4. Estimation of value of cosmological coefficient of squeezing of space (CCSS),

5. Computation of a cosmological variable (gravitational age of the Universe),

6. Acquirement knowledge about of the essence of the Newtonian constant of gravitation, as function of cosmological coefficient of squeezing of space and a cosmological variable (gravitational age of the Universe),

7. Definition of a functional connection of speed of the light in the vacuum from the cosmological variable (age of the Universe),

* yr51a@bk.ru

8. Definition of a functional connection of the Newtonian constant of gravitation from the cosmological variable (age of the Universe),

9. Definition of a functional connection of geometrical parameter of a spatial lattice (distance between the neighbouring knots) from the cosmological variable (age of the Universe),

10. Definition of a functional connection of a fine-structure constant from the cosmological variable (age of the Universe),

11. Closer definition of the fine-structure constant in the YRA-system of the Planck's constants and its sense,

12. Closer definition of the formula of the Coulomb's law (the law of interaction of electric charges) in the YRA-system of the Planck's constants,

13. Evaluation of time of phase detrusions of the first second of existence of the Universe,

14. The scenario of development of the Universe at the moment of the third phase detrusions as process of reformatting of space of the Universe and formation of loopback space is presented,

15. Calculation of the up-to-date values of the age and the average density of the Universe.

II. THE UNIVERSAL, AXIOMATIC SYSTEM OF THE PLANCK'S CONSTANTS

The basic central nexus for axiomatic build-up of system of the Planck's constants is calculation the unique, universal, cosmological constant. Leaning against this constant, also the axiomatic system of the Planck's constants is under construction. In the searches of this constant the author has touched some variants. So the variant, where the applicant was very encouraging on Cosmological constant value was considered $(2/G)^4$, where G is the Newtonian constant of gravitation. Value was other suitable candidate for a role of a cosmological constant $(c/\alpha)^4$, where α is a fine-structure constant. But all of them have been rejected for the reason not conformity (contradiction) to experimental data. There is a set of the universal systems of the Planck's constants at the heart of which build-up the axiomatic principle lies. There is the unique, natural, universal, axiomatic system of the Planck's constants (UNUASPC) at the heart of which build-up the axiomatic principle and conformity to experimental data lie. By the author this unique, universal, cosmological constant of the Universe (UUCCU) has been defined and has been calculated. For it the label is used f_U. For a label of the Planck's constants UNUASPC the standard labels with one difference are used, they are marked by the interlinear letter Y. Some

relations for the Planck's constants UNUASPC are entered by the author as postulates. Basic of the Planck's constants are entered on the basis of following equalities:

1. $m_Y = 1/\sqrt[4]{f_U}$ Planck mass,

2. $e_Y = 1/\sqrt{f_U}$ elementary charge (*postulate* of the author),

3. $l_Y = 1/\sqrt[4]{f_U^3}$ Planck length (loopback),

4. $t_Y = 1/f_U$ Planck time,

5. $f_Y = f_U$ Planck frequency.
   The others Planck's constants are computed on their bottom. We will specify some of them:

6. $c_Y = \sqrt[4]{f_U}$ speed along a loopback trajectory (loopback speed of light),

7. $T_Y = 1/l_Y = \sqrt[4]{f_U^3}$ Planck temperature (*postulate* of the author).

III. HYPOTHESES, UNIVERSE MODEL, YRA-MODEL

Hypothesis 1: (**Postulate** on Universe space) The Universe space represents a dinamic, discrete, three-dimensional, Euclidean, spatial lattice with knots and communications between the next neighbouring knots in the form of loopback trajectories.
Explanation Lattice knots are the certain material formations, which physical nature to the author is unknown. To the author the nature of loopback trajectories between the next knots of a spatial lattice is unknown also. The geometry of knots and loopback trajectories is unknown also. All should be learnt it. But it is a theme of separate examinations. The distance between lattice knots is geometrical parameter of a spatial lattice. It is calculated further.
Hypothesis 2 (**Postulate** on a motion on Universe space) The motion (elementary motion) on a spatial lattice of elementary particles or the particles transmitting interaction, is carried out from a knot to the neighbouring knot on loopback trajectories for Planck time.
Explanation The loopback trajectory has length. It is the Planck's length. It is more than distance between the next neighbouring knots. In it distinction of the author's approach from the standard approach, where for the Planck's length the distance between the neighbouring knots is accepted (by default). As length of a loopback trajectory as a curve, exceeds length of a rectilinear trajectory between the neighbouring knots **real speed** of transferring of the material carriers along a loopback trajectory exceeds the **virtual speed** of transferring of the material carriers along a rectilinear trajectory, i.e. speed of light in vacuum. Lets score (note) that Planck time remains thus invariable.

Hypothesis 3 (The Scenario of development of the Universe.) According to the author, Universe development occurs how it is described below. In our reality with cosmological frequency f_U is going the following iterative process:

1. $L = L + l_Y$ the linear growth of space,

2. $M = M + m_Y$ the linear growth of mass,

3. $a = a + t_Y$ the linear magnification of age.

It is clear that after n step of iteration the Universe will have following performances (parameters):

1. $L = n * l_Y$ linear size of Universe,

2. $M = n * m_Y$ mass of the Universe,

3. $a = n * t_Y$ the age of the Universe.

Definition The value $a_i = n$ is an iterative age of the Universe.

Explanation Note that to Universe development precedes singularity. After the termination of this process comes singularity. Here in a hypothesis and further in the article a_i is the iterative age of the Universe in steps. It is clear that the Planck's density is equal to $D_Y = f_U^2$. Universe development occurs on the iterative time (in steps) interval $0 \leq a_i \leq D_Y$. On the iterative time interval $[0, 1]$ there is a process of singularity. During the iterative time interval $[1, D_Y]$ there is own development of the Universe. On the iterative moment of time $a_i = 1$ singularity is transforming itself into the Universe. On the iterative moment of time $a_i = D_Y$ the Universe is transforming itself into singularity.

IV. DEFINITION OF A UNIQUE, UNIVERSAL, COSMOLOGICAL CONSTANT OF THE UNIVERSE (UUCCU) f_U

Value of a cosmological constant should be such that the quantities calculated on its bottom did not contradict experimental data. It is the Newtonian constant of gravitation $G = 6.67384 * 10^{-11}$ and speed of light in the vacuum $c = 299792458$. These are the experimental values. Lets enter a label l_k for distance between the next neighbouring knots of a spatial lattice. Then we have system of two equations:

$$\begin{cases} G = \frac{l_k^3}{m_Y * t_Y^3} = 6.67384 * 10^{-11} \\ c = \frac{l_k}{t_Y} = 299792458. \end{cases} \quad (***YRA***)$$

From this system of the equations the unique, universal, cosmological constant of the Universe (UUCCU) is calculated

$$f_U = 2.983882776 * 10^{47}.$$

It proves existence and uniqueness of the unique, universal, cosmological constant of the Universe (UUCCU), satisfying to the experimental values c and G. From uniqueness of a cosmological constant uniqueness of natural, universal, axiomatic system of the Planck's constants, YRA-system follows.

V. UNIQUE, NATURAL, UNIVERSAL, AXIOMATIC SYSTEM OF THE PLANCKS CONSTANTS (UNUASPC), YRA-SYSTEM

Let's give the list of formula's expressions for the YRA-system of the Planck's constants as functions of two experimental values the Newtonian constant of gravitation and speed of light in the vacuum.

1. $m_Y = \sqrt[3]{G}/c$ Planck mass,

2. $e_Y = \sqrt[3]{G^2}/c^2$ the elementary charge,

3. $l_Y = G/c^3$ Planck length,

4. $t_Y = G * \sqrt[3]{G}/c^4$ Planck time,

5. $f_Y = c^4/(G * \sqrt[3]{G})$ Planck frequency,

6. $T_Y = c^3/G$ Planck temperature,

7. $c_Y = c/\sqrt[3]{G}$ speed along a loopback trajectory (loopback speed of light).

Calculated values of the Planck's constants for YRA-system are given below:

1. $m_Y = 1.353021073 * 10^{-12}$ kg Planck mass,

2. $l_Y = 2.476929707 * 10^{-36}$ m Planck length (loopback),

3. $t_Y = 3.351338089 * 10^{-48}$ s Planck time,

4. $f_Y = 2.983882776 * 10^{47}$ s^{-1} , Planck frequency,

5. $e_Y = 1.830666023 * 10^{-24}$ C elementary charge,

6. $T_Y = 4.037256275 * 10^{35}$ K Planck temperature,

7. $c_Y = 7.390867889 * 10^{11}$ ms^{-1} speed along a loopback trajectory (loopback speed of light)

8. $l_k = 1.004705883 * 10^{-39}$ m distance between the neighbouring knots of a spatial lattice,

9. $E_Y = m_Y * c_Y^2 = c_Y = 7.390867889 * 10^{11}$ J Planck energy,

10. $\hbar = 1/c_Y^3 = l_Y = 2.476929707 * 10^{-36}$ J s Planck constant (reduced),

11. $k = 1/c_Y^2 = 1.830666023 * 10^{-24}$ J K^{-1} Boltzmann constant,

12. $\sigma = \pi^2/60 * k^4/\hbar^3 c_Y^2 = \pi^2/60 * 1/c_Y = 2.225630456 * 10^{-13}$ Stefan-Boltzmann constant ($5.670381616 * 10^{-8}$ for SSPC),

13. $G_Y = l_Y^3/(m_Y * t_Y^2) = 1$ m^{3}kg^{-1}s^{-2} coefficient of gravitation along a loopback trajectory.

From the second equation of the system of equations (***YRA***) after some computations it follows

$$c_Y/c = l_Y/l_k = 1/\sqrt[3]{G} = 2.465328160 * 10^3.$$

Definition: Coefficient of space torsion is value k_G difined by equality:

$$k_G = 1/G^3.$$

From this definition the next equalities follow:

$$G = 1/k_G^3 = c^3/c_Y^3 = l_k^3/l_Y^3.$$

From this relation it is follows

$G * k_G^3 = G * (\frac{l_Y}{l_k})^3 = \frac{l_k^3}{m_Y * t_Y^2} * (\frac{l_Y}{l_k})^3 = \frac{l_Y^3}{m_Y * t_Y^2} = G_Y$,
$G = \frac{G_Y}{k_G^3}$.

Deduction: Newtonian constant of gravitation in k_G^3 times is less than coefficient of gravitation along a loopback trajectory.

Postulate. Magnetic constant μ_0 in the system UEUASPK (YRA-system) is equal to

$$\mu_0 = 4\pi * k_G^{-2} = 4\pi * \sqrt[3]{G^2} = 2.067570805 * 10^{-6}.$$

Note: We will remind that the magnetic constant μ_0 in standard system of the Planck's constant is equal to:

$$\mu_0 = 4\pi * 10^{-7} = 1.256637061 * 10^{-6}$$

Consequence 1: Electric constant ϵ_0 in the system UEUASPK (YRA-system) is equal to

$$\epsilon_0 = \frac{1}{\mu_0 * c_Y^2} = \frac{1}{4\pi * k_G^{-2} * c_Y^2} = \frac{1}{4\pi * c^2} = 8.854187818 * 10^{-19}.$$

Note: Electric constant ϵ_0 in the standard system of the Planck's constant is equal to

$$\epsilon_0 = 8.854187818 * 10^{-12}.$$

Consequence 2: Fine structure constant and its inverse value in the system UEUASPK (YRA-system) have following values:

$\alpha = e_Y^2/4\pi\epsilon_0\hbar c_Y = 1/k_G^2 = \sqrt[3]{G^2} = 1.645320569 * 10^{-7}$,
$1/\alpha = k_G^2 = 6.077842938 * 10^6$.

Deduction: Fine-structure constant is equal to the inverse value of a square of coefficient of space torsion.
The similar deduction and concerning the Newtonian constant of gravitation arises. *Deduction:* Newtonian constant of gravitation is equal to the inverse value of a cube of coefficient of space torsion.

VI. CONSEQUENCES

Let's result some equalities that take place in YRA-system of the Planck constants

1. $t_Y = m_Y * l_Y$

2. $m_Y * c_Y = 1$ Planck impulse,

3. $f_Y = c_Y^4$ Planck frequency,

4. $T_Y = c_Y^3$ Planck temperature,

5. $E_Y = m_Y * c_Y^2 = c_Y$ Planck energy J,

6. $E_Y = m_Y * c_Y^2/e_Y = c_Y^3$ Planck energy eV,

7. $m_Y = l_Y * c_Y^2$,

8. $\hbar = 1/c_Y^3 = l_Y$ Planck constant (reduced),

9. $\hbar = m_Y * \sqrt{t_Y}$,

10. $k = 1/c_Y^2$ Boltzmann constant,

11. $k = \hbar * c_Y$,

12. $k = \sqrt{t_Y}$,

13. $c_Y = \hbar/(m_Y * l_Y)$,

14. $c_Y = f_Y/T_Y$,

15. $a_Y = c_Y/t_Y = c_Y^5$ acceleration of loopback speed of light,

16. $F_Y = G_Y * m_Y^2/l_Y^2 = m_Y * c_Y/t_Y = c_Y^4$ Planck force (loopback),

17. $D_Y = c_Y^8$ Planck density,

18. $q_Y = \sqrt{4\pi\epsilon_0\hbar c_Y} = k_G * e_Y = e_Y/\sqrt{\alpha}$ Planck charge,

19. $\alpha = (e_Y/q_Y)^2$ fine-structure constant.

VII. GENERALIZATION OF LAWS OF PHYSICS ON A LOOPBACK TRAJECTORY, THE YRA-SOLUTION

Without belittling a generality, we will view activity of these laws on examples with the Planck's constants. We will compare ordinary (usual) our understanding and the loopback understanding (YRA-understanding) of these laws. The inferior letter (symbol) k we will use to underline "rectilinear" character of interaction.
Einstein's law: $E = mc^2$. According to usual understanding of the interaction along a rectilinear trajectory the law will look like $E_k = m_Y c^2$. For a loopback trajectory it will be $E_Y = m_Y c_Y^2$. The relation of these energies is equal to value k_G^2. But this is the fine-structure constant. Here in what an essence and sense of a fine-structure constant. Here where dark energy and a dark matter (on the loopback space) is hidden.

Newton's law: $F = G * (m_1 * m_2)/r^2$. According to our usual understanding for interaction along a rectilinear trajectory the law will look like $F = G * (m_Y^2/l_k^2)$. For a loopback trajectory it will be $F_Y = G_Y * (m_Y^2/l_Y^2)$. As $G_Y = 1$, that occurs following equality:

$$F_Y = m_Y^2/l_Y^2 = c_Y^4.$$

On the other hand for the Planck force along a loopback trajectory (the loopback Planck force) the following relation takes place:

$$F_Y = G_Y * \frac{m_Y^2}{l_Y^2} = G_Y * \frac{m_Y^2}{k_G^2 * l_k^2} = k_G * \frac{G_Y}{k_G^3} * \frac{m_Y^2}{l_k^2} =$$
$$k_G * G * \frac{m_Y^2}{l_k^2} = k_G * F_k.$$

Here F_k - the Planck force or force of a gravitational interaction along a rectilinear trajectory between the neighbouring knots of a spatial lattice. *Deduction:* the Planck force along a rectilinear trajectory in k_G times is less then the Planck force along a loopback trajectory.

Coulomb's law (the law of interaction of electric charges): $F_C = 1/4\pi\epsilon_0 * q_1 q_2/r^2$. Here $k = 1/4\pi\epsilon_0 = c^2/10^7$. is any far-fetched coefficient somehow to compound among themselves separate parts of standard system of the Planck's constants $\{m_P, l_P, t_P\}$. Such should not be. In unique, natural, universal, axiomatic system of the Plancks constants (UNUASPC) $\{m_Y, l_Y, t_Y\}$ the Coulomb's law looks like:

$$F_C = c_Y^2 * \frac{q_1 * q_2}{r_Y^2} = c^2 * \frac{q_1 * q_2}{r_k^2} \quad (\textit{postulate} \text{ of the author}).$$

Labels are absolutely clear. r_Y loopback distance, r_k rectilinear distance. Coefficient k is equal to c_Y^2 for the first equality and equal to ^{2} for the second equality. Note that this postulate is a simple consequence of the previous postulate. For our example the Coulomb's law looks like:

$$F_C = c_Y^2 * \frac{e_Y^2}{l_Y^2} = c^2 * \frac{e_Y^2}{l_k^2} = c_Y^4.$$

Deduction: Both on the loopback trajectory and on the rectilinear trajectory Coulomb's forces are equal among themselves and equal to the Planck force on the loopback trajectory.

VIII. DEFINITIONS, POSTULATES, EVALUATIONS, YRA-FORMULAS

So, the author has entered concept of a spatial lattice with knots and communications between them. The author had been calculated values of the coefficient of space torsion k_G, the loopback speed of light c_Y and the distance l_k between lattice knots. Following relations take place:

$$k_G = 1/\sqrt[3]{G} \qquad G = 1/k_G^3, \qquad (1)$$
$$c_Y = k_G * c \qquad c = c_Y/k_G, \qquad (2)$$
$$l_Y = k_G * l_k \qquad l_k = l_Y/k_G. \qquad (3)$$

In these relations c is speed of light in vacuum, G is the Newtonian constant of gravitation.

Postulate. The coefficient of space torsion k_G is function of the age of the Universe.

Let's understand. In our designations a_i is iterative age of the Universe in steps, according to a hypothesis about Universe development. According to our designations a_t is the usual age of the Universe in seconds. The following relation takes place

$$a_i = a_t * c_Y^4$$

Definition: The exponential age of the Universe is value a_e, derived from the formula

$$c_Y^{a_e} = a_i.$$

From here follows

$$a_e = \log_{c_Y} a_i$$

Definition: The gravitational age of the Universe is the value a_G, defined by equality

$$a_G = \log_2 a_e$$

Considering previous, we get the following chain of equalities:

$$a_G = \log_2 a_e = \log_2 \log_{c_Y} a_i = \log_2 \log_{c_Y} (a_t * c_Y^4) = \log_2 4 + \log_{c_Y} a_t$$

It establishes connection between four definitions of age of the Universe.

Postulate. There is a cosmological coefficient of squeezing of space (CCSS) k_s. On the exponential time interval $2 \le a_e \le 8$ it is defined by equality:

$$k_s = 1000$$

Explanation: Here the explanation of an origin of this coefficient is required. At its author is not present. The coefficient accepts own value when the exponential age of the Universe becomes equal to $a_e = 2$. To this age, under the guess of the author this coefficient was equal to 1. The role and the signification of this coefficient reveals further. So, the following postulate takes place.

Postulate. The coefficient of space torsion k_G is the function of the age of the Universe and it is equal to

$$k_G = k_s * a_G$$

This postulate establishes the coefficient of space torsion k_G with the age (gravitational) of the Universe. But owing to (1) same connection of the Newtonian constant of gravitation is established with the age of the Universe. Here this communication:

$$G = (k_s * a_G)^{-3} = [k_s * \log_2 (4 + \log_{c_Y} a_t)]^{-3}$$

From (2) follows that speed of light in vacuum is function of age of the Universe:

$$c = c_Y * (k_s * a_G)^{-1} = c_Y * [k_s * \log_2 (4 + \log_{c_Y} a_t)]^{-1} = c_Y * \sqrt[3]{G}$$

From (3) follows that the distance between neighbouring knots of a spatial lattice also is function of age of the Universe:

$$l_k = l_Y * (k_s * a_G)^{-1} = l_Y * [k_s * \log_2 (4 + \log_{c_Y} a_t)]^{-1} = l_Y * \sqrt[3]{G}$$

For the fine-structure constant α following equality takes place

$$\alpha = \sqrt[3]{G^2}.$$

Therefore fine-structure constant is the function of age of the Universe.

    a. **Intervals of change.** The spatial lattice is exposed to cosmological squeezing, as a unit. By means of simple calculations there are following intervals of change.For the cosmological variable a_G (the gravitational age) there is the interval

$$1 \leq a_G \leq 3.$$

The variable monotonously increases in this interval. Its up-to-date value is equal to

$$a_G = 2.465328160.$$

For the coefficient of space torsion k_G there is the interval

$$1000 \leq k_G \leq 3000.$$

The coefficient monotonously increases in this interval. Its up-to-date value is equal to

$$k_G = 2465.328160.$$

For the Newtonian constant of gravitation G there is the interval

$$(3 * k_s)^{-3} = 3.703703703 * 10^{-11} \leq G \leq 10^{-9} = k_s^{-3}.$$

This coefficient monotonously decreases in this interval. Its up-to-date value is well known

$$G = 6.67384 * 10^{-11}.$$

For the inverse value of the Newtonian constant of gravitation $1/G$ it will be the interval

$$10^9 \leq 1/G \leq 3^3 * 10^9.$$

This value monotonously increases in this interval. Its up-to-date value is equal to

$$1/G = 1.498387735 * 10^{10}.$$

For speed of light in vacuum c there is the following interval

$$2.463622630 * 10^8 \leq c \leq 7.390867889 * 10^8.$$

The value of speed of light in vacuum monotonously decreases in this interval. Its up-to-date value is well known

$$c = 299792458.$$

For distance between neighbouring knots of a spatial lattice l_k there is the interval

$$8.256432355 * 10^{-40} \leq l_k \leq 2.476929707 * 10^{-39}.$$

The distance between lattice neighbouring knots monotonously decreases in this interval. Its up-to-date value is equal to

$$l_k = 1.004705883 * 10^{-39}.$$

For the fine-structure constantα it will be the interval

$$1/9 * 10^{-6} \leq \alpha \leq 10^{-6}.$$

This value monotonously decreases in this interval. Its up-to-date value is equal to

$$\alpha = 1.645320569 * 10^{-7}.$$

For the inverse value $1/\alpha$ the interval will be such

$$10^6 \leq 1/\alpha \leq 3^2 * 10^6.$$

This value monotonously increases in this interval. Its up-to-date value is equal to

$$1/\alpha = 6.077842938 * 10^6.$$

All above-stated intervals's of change of the specified variables are real for an iterative time interval of the Universe

$$c_Y^2 \leq a_i \leq c_Y^8.$$

It corresponds to the exponential time interval $2 \leq a_e \leq 8$.It is absolutely clear that the first second of life of the Universe is the iterative time interval $1 \leq a_i \leq c_Y^4$, or the exponential time interval $0 \leq a_e \leq 4$. Phase detrusions of the first second of existence of the Universe are following moments of the iterative time

$$a_i = \{c_Y^0, c_Y^1, c_Y^2, c_Y^3, c_Y^4\}.$$

But it is a theme of separate article.

    b. **What has occurred then?** When the iterative age of the Universe became equal to $a_i = c_Y^2$ or that the same, the exponential age of the Universe became equal to $a_e = 2$ or that the same, the usual age of the Universe became equal to

$$a_t = 1.830666023 * 10^{-24} \text{ second}$$

the next has happened. Cosmological coefficient of squeezing space (CCSS) k_s became equal to 1000. Before under the guess of the author it was equal to 1, and following equalities took place:

$$a_i = c_Y^2 \quad k_s = 1 \quad a_G = \log_2 \log_{c_Y} a_i = 1 \quad k_G = 1 \quad l_Y = l_k \quad c = c_Y$$

Coefficients of gravitation along a loopback trajectory and along a rectilinear trajectory were equal among themselves. :

$$G_Y = G_k = G = 1$$

There was no loopback torsion of space between lattice knots. The Planck's and Coulomb's forces were equal each other

$$F_Y = F_P = F_C = c_Y^4$$

When coefficient k_s at the moment of iterative time $a_i = c_Y^2$ (It is the moment of exponential time $a_e = 2$) became equal to 1000, the situation has changed cardinally. Following equalities began to be carried out

$$a_i = c_Y^2 \quad k_s = 1000 \quad a_G = \log_2 \log_{c_Y} a_i = 1 \quad k_G = 1000 \quad l_k = 10^{-3} * l_Y \quad c = 10^{-3} * c_Y$$

The space between lattice knots became tortile. Coefficients of gravitation along a loopback trajectory and along a rectilinear trajectory became equal to following values:

$$G_Y = 1 \qquad G_k = (k_s * a_G)^{-3} * G_Y = 10^{-9} * G_Y = 10^{-9}$$

The coefficient of gravitation along a rectilinear trajectory has decreased in 10^9 times in comparison with a loopback trajectory. There was as though a split (bifurcation) of uniform coefficient of gravitation on two components loopback and rectilinear. The Planck's force along a loopback trajectory remained former

$$F_Y = c_Y^4$$

The Planck's force along a rectilinear trajectory has decreased in $k_s = 1000$ times and became equal to

$$F_k = G_k * \frac{m_Y^2}{l_k^2} = G_k * k_s^2 * \frac{m_Y^2}{k_s^2 * l_Y^2} = \frac{1}{k_s} * G_Y * \frac{m_Y^2}{l_Y^2} = \frac{1}{k_s} * F_Y.$$

The Coulomb's forces the loopback and the rectilinear have not changed. At the moment of iterative time $a_i = c_Y^2$ or that the same, at the moment of usual time

$$a_t = 1.830666023 * 10^{-24} \text{ second },$$

there was, thus, a partitioning of gravitational and Coulomb's forces. The distance between lattice knots became equal to value of the relation of the Planck's lengths l_Y and cosmological coefficient of squeezing of space (CCSS) k_s. The speed of light in vacuum, i.e. speed of transition from a knot to the neighbouring knot along a rectilinear trajectory became equal to the relation of the loopback speed of light c_Y and the same cosmological coefficient k_s. Both values became in $k_s = 1000$ times less than corresponding loopback values. The Newtonian constant of gravitation became an equal the inverse value of a cube of cosmological coefficient k_s. At this moment there was a phase squeezing of the dilated Universe and formation of the up-to-date spatial lattice. There was the moment of iterative time $a_i = c_Y^2$. There was the third phase detrusion.

c. **Let's make some calculations.** Let's the moment of time is equal to the usual age of the Universe i.e. equal to

$$a_t = 1.830666023 * 10^{-24} \text{ second.}$$

According to a hypothesis of the author about model of the Universe and its development, it had following performances (parameters):

$L = m_Y = 1.353021073 * 10^{-12}$ m linear size of the Universe (cube edge),
$V = L^3 = l_Y = 2.476929707 * 10^{-36}$ m^3 Universe volume (cube volume),
$M = c_Y = 7.390867889 * 10^{11}$ kg Universe mass.

Universe squeezing has reduced Universe volume in $k_s^3 = 10^9$ times. In as much time the Universe density during the same moment of time was incremented.

d. **The age and density of the Universe** We will give the formula of calculation of the up-to-date age of the Universe. Following equalities for gravitational age of the Universe take place:

$$a_G = \log_2 a_e = \log_2 \log_{c_Y} a_i = \log_2 (4 + \log_{c_Y} a_t) = (k_s * \sqrt[3]{G})^{-1}.$$

Let's designate

$$q = 2^{a_G} = 2^{(k_s * \sqrt[3]{G})^{-1}}$$

Then the up-to-date age of the Universe in steps (iterative age) and in seconds (usual age) will equal:

$$a_i \quad = c_Y^q \text{ , (in steps)}$$
$$a_t \quad = c_Y^{(q-4)}, \text{ (in seconds)}$$

There are very simple expressions. Calculation under these formulas shows that if $G = 6.67384 * 10^{-11}$, that the usual age of the Universe is equal to $a_t = 37.26$ Gyr. It is the up-to-date age of the Universe. Its exponential age is equal to $a_e = 5.522525443$. Its gravitational age is equal to $a_i = 2.465328160$. Calculation under the same formula shows that if $G = 6.752099 * 10^{-11}$, that the usual age of the Universe is equal to $a_t = 13.75$ Gyr. It is the up-to-date age of the Universe according to the primary source [4]. Its exponential age is equal to $a_e = 5.486045070$. Its gravitational age is equal to $a_i = 2.455766475$. This discrepancy in an estimate of the up-to-date age of the Universe under the theory and on experimental data demands the explanation. At the author while it is not present. Let's estimate average density of the up-to-date Universe under the formula

$$D_t = \frac{M_t}{V_t} = \frac{1}{a_i^2} * D_k = \frac{a_i * m_Y}{(a_i * l_k)^3} = \frac{k_G^3}{a_i^2} * D_Y = k_G^3 * c_Y^{(8-2*a_e)}$$

If to accept an author's hypothesis of development of the Universe we will get following effects:

$D_t = 1.083753912 * 10^{-26} \text{ kg m}^{-3}$ if the age of the Universe is equal to 37.26 Gyr,
$D_t = 7.865887927 * 10^{-26} \text{ kg m}^{-3}$ if the age of the Universe is equal to 13.75 Gyr.

Postulate. The average temperature of the Universe is calculated under the following formula

$$T_t = \frac{T_Y}{\sqrt{a_i * k_G}} = \frac{T_Y}{c_Y^2 * \sqrt{a_t * k_G}} = \frac{c_Y}{\sqrt{a_t * k_G}}$$

Calculation under this formula yields following effects:

$T_t = 13.7273$ K, if the age of the Universe is equal to 37.26 Gyr,
$T_t = 22.6412$ K, if the age of the Universe is equal to 13.75 Gyr.

Let's make one note concerning of speed of light in vacuum. Its up-to-date value is equal to $c = 299792458$. Approximately 32000 years ago it was equal to $c = 299792459$. Approximately in 32000 years it will be equal to $c = 299792457$. It simply calculates.

IX. DISCUSSIONS, YRA-PROBLEMS

The author in given article presents effects of the conducted examination for the purpose of the best understanding of the world surrounding us. All in the world is material. Dynamic, discrete, three-dimensional, the Euclidean's lattice with knots and communications between them, the spatial lattice entered by the author, was a corner stone for build-up of whole theory. The idea of a motion of a matter (substance) has allowed make the guess that motion on space on a spatial lattice occurs discretely from a knot to a neighbouring knot on the curve loopback trajectories. The Nature, having given us in the order a spatial rectangular lattice, has taken care of our comfortable existence. Simultaneously it has hidden the true essence on the loopback trajectories. Now it became clear. Ideas of a spatial lattice and the loopback character of a motion have led the author to a problem of the Planck's constants and this problem has been solved. On the basis of a unique, universal, cosmological constant of the Universe (UUCCU) the unique, natural, universal, axiomatic system of the Planck's constants (UN-UASPC), YRA-system is constructed. The solution was very simple and natural. Very interesting consequences from this solution, but they in article were mentioned partially. It is a theme of other article. In turn it was an incitement for the further analysis. It has appeared that there is a simple explanation of dependence of the speed of light in vacuum, Newtonian constant of gravitation and a fine-structure constant from age of the Universe. The amazing effect had appeared, as the spatial lattice is exposed to the continuous squeezing. The spatial flesh continuously changes. All in the world change. There is nothing invariable in the world. In the world exists and rules him the unique, universal, cosmological constant of the Universe (UUCCU). Within article there were not solved some questions. It is necessary to answer on them. For example, the discrepancy of experimental data about the up-to-date age of the Universe with theoretical calculations is not explained. There were unclosed

for examination and discussions many questions. Among them is geometry and physics of spatial knots and their communication with the neighbouring knots. Value of a cosmological constant as cosmological frequency should be an integer. It should be found. It would be desirable to know, why a cosmological constant f_U has this value. Cosmological coefficient of squeezing k_s demands the further explanations. On an exponential time interval $2 \leq a_e \leq 8$ it equal to $k_s = 1000$. It well explains Universe development at this time. Under the guess of the author till the exponential moment of time $a_e = 2$ it was equal to 1. But that has served as the reason of such sharp change of this coefficient it is not known to the author. It would be interesting to have the full clearness on phase detrusions of the first second of existence of the Universe. The further examinations are necessary. Singularity occupying in the Universe development only one instant while remains not learnt. Whether our world is unique or there is a set of the worlds? How the Nature defines the dimensionality of space of the future Universe, during what moment of time? Why in our case the Nature has selected the three-dimensional world? Consequences from the analysis of unique, natural, universal, axiomatic system of the Planck's constants (YRA-system), unclosed by the author are interesting. For example, $t_Y = m_Y * l_Y$ or $m_Y = l_Y * c_Y^2$. It is a good occasion to the further examinations and philosophical reflexions.

X. INFERENCE

The author in the present article presents a physical pattern of a universe. At the heart of this pattern five components lie. bf First, it is a postulate on materiality and variability of the world. **Second**, it is a postulate on Universe space, as a discrete, three-dimensional, Euclidean lattice with knots and communications between them. This spatial lattice is in the vacuum. **Third**, it is a postulate of a motion on space as transferring between the neighbouring knots of a lattice on loopback trajectories. **Fourth**, it is unique, natural, universal axiomatic system of the Planck's constants. **Fifth**, it is a hypothesis of the author about Universe development. The pattern of a universe presented by the author does not contradict available experimental data. It is first of all such cosmological parameters, as speed of light in vacuum and Newtonian constant of gravitation. On the contrary they also serve as the first acknowledgement of correctness of this physical pattern of a universe. This pattern of a universe explains sense and an essence of already available knowledge of the Universe and its laws is better. It concerns the Newton's law of gravitation. It concerns the Coulomb's law improvement about interaction of electric charges. It concerns an Einsteins law about mass and energy communication. It concerns such concepts as a dark matter and dark energy. Their site is spotted. Their place is on the loopback space. There

is more clear a legitimacy of allocation of phases of the first second of existence of the Universe. Boundaries of phases are integer values of exponential time. Reality boundaries are moved apart to a loopback space. This physical pattern of a universe corresponds to our reality, than existing models more full and more precisely, than existing models. Our perception of the validity refracts a loopback reality on straightforwardness. We for some reason consider interaction rectilinear. It is easier for our understanding. But it is our illusion.

Deduction: **Our reality is loopback. In a reality there is only a loopback interaction**.

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