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The Birth and Evolution of the Universe with Minimal Initial Entropy

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Abstract

In this paper using the Law of similarity and the Law of unity a model of creation and evolution of the Universe proposed in which the laws of physics are performed. The model implies that our Universe is a part of a Super-Universe as a separate layer in the multi-fiber space, and the information communication exists between adjacent layers through the single delocated point. During the formation of Super-Universe it was filled first a one-dimensional World of Field-time, then a two-dimensional (1 + 1) World was filled with energy and Planck's particles which carry the electric and magnetic charges. Completion of two-dimensional World filling leads to an "overflow" of energy into the neighboring three-dimensional World which presents a World of known quarks that have the fractional electric charges, color charges, and spins. The next step is an "overflow" of energy into the four-dimensional (3 + 1) World and the birth of the particles of this World. Evolution of this World has a completion by the brane creation of five-dimensional World. The proposed model supports the anthropic principle in the Universe.

Keywords: Model creation of the Universe, the fiber space, Planck particles, the anthropic principle.

The models of Universe, likely to any others, are based on the theoretical concepts that exist currently in cosmology. Modern cosmology arose after the appearance of the general theory of relativity, and that is why, in contrast to the former classic one, it was called relativistic. A new stage of its development has been linked with investigations of A. A. Friedman, who was the first to prove the theory about the Universe which was filled with gravitating substance and namely so coul not be stationary. This fundamentally new result has found confirmation after a discovery of redshift by Hubble in 1929, which was interpreted as a phenomenon of galaxies "divergence". In this regard, at the first plane the problems appear of the Universe expansion study and determination of its age via duration of this extension. The third period of the development of cosmology is connected with the works of G.A. Gamow. There are studied the physical processes taking place in the various stages of the Universe expansion.

All scientists proceed from the assumption that the Universe was first in conditions which were characterized by high temperature and pressure in the singularity, where all matter was focused. Then it was cooled gradually as the Universe expanded. Model hot Universe was first proposed by G.A. Gamow and later was called standard.

Model G.A. Gamow required answering some important questions. In particular, if all matter was concentrated in a singularity, then why a black hole did not appear there? What determines the arrow of time? Does the Universe has any boundary in space? Are the laws of thermodynamics true in the process of evolution of the Universe? If the Universe is infinite, why night is dark? Can there a space exist without matter? And many others, not less important and fundamental issues.

Unfortunately, the numerous models of the birth and evolution of the Universe bypass some of these important issues and therefore can not be acceptable, because clearly are in the

contrary with laws of physics. There are attempts have been done to remove some of the contradictions of the standard model. For example, it was developed the inflationary model of the Universe. However, in this case, some contradictions are simply replaced by others. Therefore, the problem of birth and evolution of the Universe is extremely urgent.

In this situation, the author decided to offer its own model that would not contradict the named physical principles and uniquely would be able to answer these questions [1]. The Laws of similarity and unity everywhere in the Universe have put into the base of model proposed by the author.

It is known that the Universe has the hierarchical structure, what leads to the implementation of the Law of similarity [2]. Moreover, in [2] the principle of hierarchical similarity was considered as a new fundamental law of physics. In addition, the Law of similarity is uniquely described by means of the Tree of Life that enabled the author of the monograph [2] to create a theory of hierarchical systems and create various schemes of free electron lasers. We shall use this information at modeling the processes of birth and evolution of the Universe.

Prenatal development of the child

According to the theory of hierarchical systems and a doctrine of the Tree of Life all the processes in the Universe are taking place on the same scenario, although at different levels and at different scales. On this basis, to solve the problem, we will compare the stages of prenatal development of the child and the stages of the birth and evolution of the Universe.

First of all, for the beginning of intrauterine development of the child a fertilization of the female egg by sperm must be performed. Next follows a relaxation time up to creation of a full-fledged cell ready to reproduce. To start the process of cell division it is required the income of information about the beginning of cell division. The cell has a written information about what kind of the human body should be developed in utero. Consequently, there should be two types of information.

It is logical to assume that the information about the beginning of cell division must come from outside. This is suggested by the fact that among the animal world there are cases represented when a fertilization takes place immediately after the birth of females, while the beginning of cell division occurs after puberty of animal. Similarly, in the already formed body after its birth the cell division occurs only when is necessary, and the information about the need is coming from the body.

Go back to the first cell of the future body. It was stated above that the entire program the of a living body creation has been lain into the first cell. The energy necessary for the cell multiplication and development of the organism has received by the first cell. The building of body is going in accordance with the hierarchical law, i.e., the fibers are forming first (one-dimensional objects), then the tissues (two-dimensional objects) and three-dimensional objects are forming. Since the three-dimensional objects are functional, then, before they have been created, the information must be received about the creation of these objects and their future activities. Thus, three-dimensional objects immediately begin the functional activity, depending on the organ authority. In accordance with the hierarchy of the body's, the creation of three-dimensional objects is going as follows: the creation of monofunctional organ (slices), then the slices are combined into a multifunctional organ (liver, kidney, etc.). In turn, the multifunctional organs are combined into systems (nutrition, metabolic, blood circulatory, nervous, protective, immune, etc.). All systems of the body are formed. So during in utero development of child its organs completely perform their functions.

At a birth of child an additional information must be introduced to provide a transition to the autonomous functioning of the body. The child is separated from the power of the parent organism (by cut of the umbilical cord), begins to breathe (lungs are switch on), consume food and so on. The period of intrauterine life ended.

Model creation and evolution of the Universe

Like the beginning of intrauterine development of child the energy and information is introduced to the certain point (World-1). This point has no spatial dimension. We characterize it as a World of Field-time. Thus a program immediately has been created for the future structure of Super-Universe as a multi-fiber bundle. The ***first*** starting point of the proposed mechanism of birth and evolution of the World is the claim that the beginning and the continuation of the future evolution of the Super-Universe is concluded in the its expanding with the **speed of light**, and all its components immediately have got the expansion: a one-dimensional space (World-2), a two-dimensional space (the World-3) and three-dimensional space (World-4). In order not to disrupt traditional name, the World-4 is denoted as the Universe while the multi-fiber bundle consisting of zero-dimensional space, one-dimensional space, the two-dimensional space and the three-dimensional space is called as Super-Universe. At the same time, World of Field-time is a state of pure becoming, status of the **Primary Vortex, Vortex Motion the Beginning** and the Main Driving Force. It follows that the vortex structure of the Universe is set by Field, which generates one-, two- and three-dimensional Universe, where everything is revolving. From a birth up to the end Universe is fractal, and all its fractals are revolving.

Thus, the Field produces multi-fiber space and time inside of it. With respect to the Field, it can be only a **scalar**. The Feld brings the energy which fills all the named area of space, likely to the connected vessels filled with liquid. The size of the spaces ("receptacles") increases with time. The rate of filling of the first two "vessels" by "liquid" exceeds the rate of increase in volumes of "vessels," so that "liquid" flows into the next "vessel". So, in turn, the one-dimensional space filled with energy, then the two-dimensional space and, finally, energy comes in three-dimensional space. Thus, the three-dimensional space begins to fill up with energy only after a certain period of time ΔT. If the beginning of the Super-Universe birth is considered since the beginning of the filling power into the World-2 and at the same time the expansion of Super-Universe space begins, then time of filling for World -2 will be very small (perhaps 10^{-30} s). While the filling of energy into the World-2 is going, the World-3 will have time to expand significantly, and therefore the time of its filling will be a bit more (perhaps 10^{-6} s). At such case after a time interval $\Delta T_0 \sim 10^{-6}\, s$ the filling of energy into World-4 will begin. Note that in the Super-Universe information communication between layers of multi-fiber space exists only via a delocalized point [3].

The ***second*** starting point for us will be the next Property of the Field: its ability to create directly the particles of matter in all spaces of the stratified Super-Universe according to the formula $\boldsymbol{E = mc^2}$. That is difference in comparison with the electromagnetic vector field[1], which may create a particle-antiparticle pair at certain circumstances. As the World-1 has no charges the created matter must be electrically neutral. It means that in the World-4 only clusters of neutrons will be created, which are characterized by the zero values of charge, spin, and so on.

By that way, World-4 will initially expanding without substance inside of it excepted filled vacuum state. Therefore, in this World any singularity will not be. Substance (at once a complete set of fermions and bosons) will appear only then when the initial density of matter will not exceed the density of nuclear matter. This is the ***third*** starting point.

"Overflow" of Field's energy into the World-2 (space-time) is accompanied by the production of heavy charged particles - preons (conventionally, quark-2), which charge value is equal to the magnitude of charge $q_1 = \pm q_2/2 = \pm e/6$ (q_2 is a quark charge of three-dimensional space- time, e is the electron charge). Here we introduce the assumption (the ***fourth*** starting point), according to which the minimum charge in a particular layer Super-space is defined by its dimension. Therefore, quarks-3 have a charge $q_2 = \pm e/3$, diones has $q_1 = = \pm q_2/2$.

Two-dimensional World is electrically neutral. Simultaneously with the appearance of preons there are conditions appear for the existence of two-dimensional bosons, which will

[1] Physicists are familiar with the waves of electromagnetic nature, in particular, the de Broglie wavelength, but in all cosmological theories take into account only the electromagnetic waves that accompany the birth and annihilation of elementary particles.

provide an interaction between preons. Since this interaction will generate a three-dimensional World of the particle (quarks-3), it should be considered that these bosons simultaneously belong to both World-2 and World-3. For the World-3 the two-dimensional World is a Hidden World, and the three-dimensional World (the world of quarks) is the Displayed World. It is clear that belonging of boson to both Worlds is realized through the transfer of information and spatial metamorphosis [3]. Consequently, we have the ***fifth*** starting point of our model.

Taking into account the **Law of unity as the Supreme Law of the Universe**, we need to accept as the basis that that the Field feels, controls and directs all processes at the creation of the World. That is, we take as a postulate (***sixth*** starting point), that the Field has enough energy, information and Program for the material world creation and the World of the Living, that is our Universe. Thus, in order to existence of the electromagnetic Field (EMF) in three-dimensional space was possible, it is needed that in the one-dimensional space, where there is no pre-conditions for the existence of EMF, to be produced with necessity one-dimensional particles which carry both electrical and magnetic charges. Hence, the particles in the one-dimensional space must necessarily be **diones**, i.e. simultaneously be carriers of the electric and magnetic charges. The birth process of these particles in one-dimensional space will continue as long as the mass of the substance will rise in the space of the highest dimension.

Creation of the first spatial coordinate it is a Big Bang for the two-dimensional World. In one-dimensional space all interactions should be too deterministic. Therefore, the evolution of the two-dimensional World would be short-living. During this time, the size of the two-dimensional World would be not so great, and that will determine the time of transition to the next, three-dimensional World. Over time, the size of the two-dimensional World will increase, allowing the evolution of the Worlds of higher dimensions.

Since the two-dimensional World should only one spatial coordinate, there are no pre-conditions for the creation of vortex electric and magnetic fields.

In this case, it becomes clear why, starting with the World-3, we do not find magnetic monopoles, but notice that all quarks of three-dimensional World and elementary particles (or the vast majority) of four-dimensional World have a spin. This is because diones united so that magnetic charges do not go to the Worlds of higher dimensions and generate a spin.

The rapid saturation of the two-dimensional World by diones and the conversion of two-dimensional space-time three-dimensional brane space-time causes the emergence of a strong information exchange between World-2 and World-3. This creation of diones continues in account of Field of one-dimensional World.

It is worth to note that the initial Field is so powerful that it will supply the energy for the creation and evolution of all the other spaces. That is, we have the dark energy, which are looking for and can not be found any theoreticians or astronomers.

Saturation brane by diones in two-dimensional space promotes aphase transition, namely the creation of particles in three-dimensional space-time, which is characterized by equal contributions of spatial coordinates x and y. So there was a Big Bang for the three-dimensional World. There particles have been created in the three-dimensional space-time with charges $\pm q_2$ and $\pm 2q_2$, where $q_2 = e/3$, e is an elementary charge in four-dimensional space-time[2]. Saturation of the three-dimensional World by particles will lead to its transformation into a brane of four-dimensional World. In parallel, the bosons of three-dimensional World are created, they are responsible for the strong interaction between quarks and for weak interaction. Saturation of the three-dimensional space by "fluid" is completed after $\Delta T_0 \sim 10^{-6}\, s$ (it still has the very small dimensions).

Again, due to the strong interaction between quarks particles generates four-dimensional World (conditionally: quarks-4[3]), you should assume that these bosons belong to both the World-

[2] Information about the localization of the quarks in the Hidden World (2 + 1) first appears in the monograph [2].
[3] It seems that for particles of four-dimensional world the best name will not quarks-4 bat hyhelith, from the hydrogen, helium, lithium.

3 and World-4. Thus for World-4 the World-3 will be Hidden World, while our Universe is the Displayed World. As before, the bosons belonging to both Worlds is realized through the transfer of information, and through the spatial metamorphosis [3].

In the three-dimensional World is still not a sufficient condition for the existence of the vortex magnetic field, which requires three spatial coordinates. Instead for the electric and magnetic fields a new feature appears: in addition to the longitudinal waves the transversal electric and spin waves can arise and spread. Then the waves have a helical configuration (longitudinal-transverse wave).

Before proceeding to the next phase transition, pay attention to the dimensions of the particles in the World-2 and World-3. It is axiomatic that the particles have finite dimensions in the manifested axes: accordingly, in one and two coordinate axes. It might seem that in other dimensions the particles have a size zero, that would create difficulties for the description of such particles. However, we know that along with the manifested, there are additional dimensions rolled-up measures exist [4,5]. And besides the length of the folded dimension only 1-2 orders of magnitude larger elementary length. The presence of these measurements suggest that diones have not less than three-dimensional structure, but can move only in one dimension. Other measures are provided for the emergence of certain properties of particles, and not for motion. Thus, the mechanical motion of a particle is possible only along the manifested dimension.

Similarly, we can describe the structure of the particles of the World-3, where two measurements are displayed and at least one dimension is closed. This situation contributes to the presence of motion in only two manifested dimensions.

It is worth to mention that the described conditionally three-dimensional space World-2 and World-3 do not intersect and do not have a common measurements between themselves and the World-4. Thus, we arrive to the necessity at least $(3+3+7)$[4] measurements of the existing Super-Universe. Including information measurement, we have 14 dimensions. Most likely, these measurements are enough for a complete description of all the properties of Super-Universe as a whole, and each World in particular. The number of displayed dimansions for Universe is equal to 4, and the number of hidden dimensions is equal to 3, common number is 7.

After the completion of inflation of the three-dimensional World (through $\Delta T_0 \sim 10^{-6}\, s$) a phase transition occurs, that is the Big Bang for the four-dimensional space-time (3 + 1). The particles of four-dimensional space-time (quarks-4, *gaygelits*) have been produced: electrons, protons, deuterons, two kinds of helium nuclei and two types of lithium nuclei. Thus, at the increase of charge of positively charged particles their number decreases essentually.

In the four-dimensional World the so familiar for us light quanta are created, which can have linear or circular polarization and move at the speed of light. They, being virtual, are responsible for electromagnetic interactions between the particles.

The energy of the electrostatic interaction with the distance will be reduced to zero. This character of interaction should lead to the fact that at the transition of four- dimensional World to the brane of five-dimensional World the particles of four-dimensional World will be able to coexist with particles of brane of a five-dimensional World (no confinement). This situation can have significant consequences. In particular, the absence of confinement for particles of a four-dimensional World and for particles of brane of five-dimensional World would be an obstacle to the creation of the five-dimensional World. Consequently, brane of the five-dimensional World is the ***final stage*** of evolution of the Universe (Super-Universe which unites a one-dimensional latent space, a two-dimensional latent space and the displayed three-dimensional space)[5]. This statement supports the Law of similarity intrauterine development of the child.

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[4] A World of 3 + 1 dimensions is much richer by the particles and fields, and therefore requires a minimum of 7 measurements (3 of them are closed).

[5] This conclusion follows from a comparison of pre-natal development of the child and the development of Super-Universe.

The emergence of neutrons in the four-dimensional World is accompanied by a $W(Z^o)$-bosons responsible for weak interaction [6]. Since this interaction is accompanied by changes both neutrons and quarks, bosons are located simultaneously in the three-dimensional and four-dimensional World.

Saturation brane two-dimensional space diones promotes phase transition - the creation of particles in three-dimensional space-time, which is characterized by equal contributions spatial coordinates x and y. So there was a Big Bang for the three-dimensional World. This creates a three-dimensional particles of space-time with charges $\pm q_2$ i $\pm 2q_2$, where $q_2 = e/3$, e - elementary charge in four-dimensional space-time. Saturation of the three-dimensional World particles will lead to its transformation into a World of four-dimensional brane. In parallel, three-dimensional World are bosons, which are responsible for the strong interaction between quarks and weak interaction. Saturation of the three-dimensional space "fluid" is completed after (it is still a very small size).

Birth and stabilization of electrons and nuclei ${}_1^1H$, ${}_1^2D$, ${}_2^3He$, ${}_2^4He$, ${}_3^6Li$, ${}_3^7Li$ the formation of the four-dimensional World has been comnpleted (through $\Delta t \sim 10^2$ s). Its transformation into a brane of five-dimensional World is accompanied by the birth of heavy ($Z > 3$) nuclei for which the particles of four-dimensional World[6] will be components.

Inflating the four-dimensional World as a brane of five-dimensional World takes a very long time due to a significant increase in the size of the Universe. Therefore, time of inflation may exceed $\Delta t \sim 10^{18}$ s. When the brane is inflated, a density of five-dimensional World decreases, what is an additional evidence in favor the fact that the brane of five-dimensional World is the final phase of the Super-Universe evolution (at the creation of the four-dimensional World a density of matter in the brane of three-dimensional World grew that gave growth to the Big Bang).

And, although the evolution of the Super-Universe will finished before the formation of a five-dimensional World, the ability to create it will set the algorithm for the existence of the main types of charges in four-dimensional World [1].

Pay attention to the similarity of prenatal development of the child and the evolution of Super-Universe. The fertilized egg will correspond to the creation of embryo for the Super-Universe designated as "Field + time" or a one-dimensional World of Field-time. Then the creation of fibers will mean the creation of a one-dimensional space, and the path to the creation of tissue will be the way to the formation of brane of two-dimensional World.

Creation of two-dimensional space will correspond to the formation of tissues, and the evolution of two-dimensional space to the brane of three-dimensional space is the way to the formation of three-dimensional functional organs.

Now let us make a small pause. It should be noted that the one-dimensional and two-dimensional space does not provide conditions for the development of intelligent life. Therefore, it does not appear there. A three-dimensional space ***is created just for*** that to give a life to gain all possible forms (the anthropic principle in the Universe [7]). So, before a four-dimensional space-time will be created, it is necessary to ensure the transition by the presence of intelligence information about upcoming intelligent life.

Only now there are all reasons to create the four-dimensional space-time. Then our World will be converted to the brane of the five-dimensional space-time.

Just as a child at the birth receives an additional information, for the creation of higher level of life in the Universe an additional information must enter.

Taking into account the **Law of unity, as the Supreme Law of the Universe**, we must accept the fact that the information about the life is acting at all hierarchical levels of the World-4, that is, we are dealing with a sensible Universe. Otherwise, no life could exist on the Earth!

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[6] As the molecule is composed of atoms, so according to the law of similarity nuclei of heavy atoms should consist of light nuclei, ie, nuclei of heavy atoms have a molecular structure.

It is interesting in this context to draw attention to the theory of the noosphere, which was developed by Vernadsky [8] and that includes not only the biosphere of the Earth but the Universe as well.

Unexpected confirmation of the conclusion about the creation of reassonable Universe was the information about calculation of two geneticists, Richard Gordon of Gulf Specimen Marine Laboratory and Alexei Sharov of the National Institute on Aging, who used a biological analogue of Moore's Law to determine the age of DNA and found that the DNA came 10^{10} years ago, that is, life is 2 times older than our planet (on the geological data Earth created $4{,}5\cdot10^{9}$ years ago) [9]. Consequently, the program of intelligent life appeared immediately upon creation of the World-4 and was implemented on Earth when the relevant environmental conditions were acieved needed for the existence of life.

If the Universe began its evolution from a singular point, then it would have been inside the black hole. Estimates for the gravitational radius are following:

$$r_G = \frac{GM}{c^2} \sim \frac{6{,}67259\cdot10^{-11}\cdot10^{53}}{9\cdot10^{16}} = 7{,}4\cdot10^{25}\ m = \frac{7{,}4\cdot10^{25}\ м}{9{,}46\cdot10^{15}\ м/св.р.} = 7{,}84\cdot10^{9}\ light\text{-}years.$$

For this calculation a raised mass of the Metagalaxy has been used (instead of the real average density of matter in the Metagalaxy it was used its critical value, i.e. $\rho_{cr} = 10^{-29}$ g/cm^3).

To avoid an inaccuracies of the standard model, let use the proposed above mechanism and assume that at all stages of evolution of the Universe its gravitational radius is significantly smaller than the radius of the Universe, i.e., $r_G = \eta R_U$, $\eta << 1$. Since the born space increases its radius with the speed of light, $R_U = cT_U$. There T_U is a lifetime of Metagalaxy.

To simplify the task we perform calculations for four-dimensional World, not for the brane of five-dimensional World.

AT given $r_G = \frac{GM_U}{c^2} = \eta R_U = \eta c T_U$, we find: $M_U = \frac{\eta c^3 T_U}{G}$.

Consequently, the formation of matter in our world is carried out continuously at the same speed[7]

$$\upsilon_m = \frac{dM_U}{dT_U} = \frac{\eta c^3}{G} = \frac{\eta\cdot27\cdot10^{24}}{6{,}67\cdot10^{-11}}\ kg/s = \eta\cdot4{,}05\cdot10^{35}\ kg/s.$$

For the average density of matter in the Universe is

$$\rho = \frac{3M_U}{4\pi R_U^3} = \frac{3\eta c^3 T_U}{4\pi G c^3 T_U^3} = \frac{3\eta}{4\pi G T_U^2} = \frac{3\eta}{4\cdot3{,}14\cdot6{,}67\cdot10^{-11}T_U^2} = \frac{3{,}58\cdot10^{9}\eta}{T_U^2} \qquad (1)$$

To carry out the calculation of the quantities M_U, υ_m and ρ, we must select the initial conditions. The value of T_U can be found using the value of the Hubble constant H = 73.8 km/(s·Mpc) = $0.755\cdot10^{-10}$ years^{-1} = $2.392\cdot10^{-18}$ s^{-1} [10]. In this case, we assume that the redshift is stipulated by the expansion of space, rather than the recession of galaxies. Hence T_U = $13.25\cdot10^{9}$ years = $4.18\cdot10^{17}$ s, R_U = $1.25\cdot10^{26}$ m. The space is completely filled with the substance. From (1) we find the parameter η, taking the density of $\rho = 0.05\cdot\rho_{кр} = 5\cdot10^{-28}$ kg/m^3: η = 0.0244. The rate of formation of matter will be $\upsilon_m = 1\cdot10^{34}$ kg/s, i.e., about 5000 solar masses per second. Modern mass of the Universe ($4.18\cdot10^{51}$ kg) was an order of magnitude less than expected. Consequently, the effective number of stars with a mass equal to the mass of the Sun, ($M_s = 1.99\cdot10^{30}$ kg), equal to $2.1\cdot10^{21}$.

[7] The scientists are getting used that a law of conservation exists for the baryon number, because it corresponds to the experimental facts in all interactions and transformations of baryons. However, they forget that in the process of the Universe creation following the standard model the baryons had been absent in a singular point. The baryons appeared in the evolution of the Universe. Hence, at the Universe birth a law of baryon number conservation was not working. In the author's model the process of the Universe birth is going continuously. In this case, the conservation of baryon number is not possible. At the same time a baryon number is preserved in the process of a strong or weak interaction.

To estimate the time T_{Uo} of start for substance filling in the World-4 take as a basis that the density of matter at this point should be $\rho_o \approx 10^{17}$ kg/m^3. In this case, the calculation gives $T_{Uo} = 3\cdot10^{-5}$ s. At this point, the radius of the Universe was equal to 9 km. From this moment, the filling of volume by matter begins to go at a constant speed. In this case, the formula (1) for the first second of the Universe's expansion will look like

$$\rho = \frac{3\upsilon_m T_U}{4\pi R_U^3} = \frac{3\eta T_U}{4\pi G\left(T_U + T_{Uo}\right)^3}, \qquad (2)$$

In this formula, the time T_U is measured from the Big Bang in the World-4. Within 1 second after the Big Bang the formula (1) and (2) will be no different. According to (2) the density of matter initially increases reaching a maximum at $T_U = T_{Uo}/2$. However, only ~15% of the volume is occupied by the substabce. Consequently, some embryos will be formed for the future stars and galaxies. After 1 second the average density value fell to $8.74\cdot10^7$ kg/m^3.

If we assume that on average every star has to equal the mass income, then the Sun gets $4.76\cdot10^{12}$ kg/s. In this case, the mass of the Sun for the year will increase by $1.5\cdot10^{20}$ kg, and for $1.325\cdot10^{10}$ years up to $1.99\cdot10^{30}$ kg, that is, the entire mass of the Sun.

Establishment of galaxies and stars requires that during the substance creation in the World-4 it must be immediately structured that can be provided only by the **fractal structure** of the embryo of the Universe, and each fractal should have a rotational torque. In addition, the Big Bang in the World-4 should make the lowest possible entropy, i.e. the born substance must be **cold**. On further admission of substance into the existing mass its heating will occur. In [1] it was shown that in this model the entropy of the Universe must increase with time, what corresponds to the laws of thermodynamics and determines the thermodynamic arrow of time.

Knowing the average density of matter in the Universe, we can estimate the average value of the effective density of quark matter in the World-3 and dione substances in the World-2. For the assessment we assume that the mass of the substance in each layer is the same. We use formulae

$$\rho_3 = \frac{M_U}{V_U} = \frac{3M_U}{4\pi R_U^3}; \quad \rho_2 = \frac{M_U}{S} = \frac{M_U}{\pi R_U^2} = \frac{4}{3}\rho_3 R_U; \quad \rho_1 = \frac{M_U}{2R_U} = \frac{2}{3}\rho_3 \pi R_U^2.$$

Hence we find that quark matter has an effective value of the density $\rho_2 = 8.33\cdot10^{-2}$ kg/m^2. At the same time we get to the diones substance $\rho_1 = 1.64\cdot10^{25}$ kg/m. Consequently, the substances in the World-3 still is rarefied, and in the World-2 it is strongly compressed from the point of view of the World-4.

An interesting comparison: if nuclear matter will be arranged in a chain, we shall get a linear density of $\rho_1 = 1.267\cdot10^{12}$ kg/m, and if will be created a flat structure then $\rho_2 = 1.11\cdot10^3$ kg/m^2. Thus, the effective density of quark matter is on 4 orders of magnitude lower than nuclear density, while diones matter is greater by 13 orders of magnitude. However, it is possible that the actual mass of diones and quark matter differs significantly from this estimate, since these substances are situated in other layers of the Universe, where there are no preconditions for the emergence of mass usual for us.

Another important comparison of found linear density with Planck's parameters. We know that the Planck's mass is $M_p = 2.176761\cdot10^{-8}$ kg and the Planck's length is $l_p = 1.616\cdot10^{-35}$ m. If the particles with the Planck's mass are arranged in a linear chain, we obtain a linear density of $\rho_1 = 1.347\cdot10^{27}$ kg/m. As you can see, the parameters obtained for the Planck's linear density by 2 orders exceed our estimates for a density of dyons matter. Taking into account the dilution parameter $\eta = 0{,}0244$ and apply it to the calculation of the Planck's density of matter, then get $\eta\rho_1 = 3.29\cdot10^{25}$ kg/m, which is only 2 times more than we have found an effective value of the density of matter diones. Such proximity of obtained parameters value shows that **Planck's parameters** (mass, length, time) **are realized namely in one-dimensional space of World-2.**

Conclusion

In this work on the basis of the similarity Law and the Law of unity in the Universe, a model of creation and evolution of the Universe is proposed in which the law of physics are true. To create the model an information about the prenatal development of child has been involved, as well as the concept of the Tree of Life, what allowed to describe the structure of the Universe and all the stages of creation and evolution of the Universe.

1. Our Universe is part of the Super-Universe, is a separate layer in the multi-fiber bundle. Information communication between the individual layers is carried out through a single delocalized point.

2. In the process of creation a Super-Universe a one-dimensional World of Fields-time was filled. This World has not the particles, but has a powerful field and information about the next steps of Super-Universe creation.

3. Energy of the Fields is overflowing into the adjacent two-dimensional (1 + 1) World in which the pairs of Planck's particles have got a birth with opposite electric and magnetic charges, their movement is limited to one spatial coordinate.

4. End of filling a two-dimensional World leads to an "overflow" of energy into a nearby three-dimensional World - a World of known quarks with fractional electric charges, color charges and spins. The next step is a "overflow" of energy into the four-dimensional (3 + 1) World and particle creation of this World. The evolution of the World completes by the creation of brane of the five-dimensional World. This evolution is accompanied by the birth of a whole set of stable and unstable heavy nuclei and atoms. Filling of each new layer in multi-fiber bundle does not introduce entropy into this space (the start of evolution is cold and completely deterministic).

5. To create a life in our Universe and, in particular, a man on the way from three-dimensional to four-dimensional World the relevant information was introduced.

6. The proposed model does not lead to the possibility of the collapse of the Universe into a black hole. The model supports the anthropic principle in the Universe.

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Анотація

В роботі з використанням Закону подібності і Закону єдності у Всесвіті запропонована модель створення і структури Всесвіту, в якій виконуються фізичні закони. З моделі випливає, що наш Всесвіт є частиною Супер-Всесвіту, окремим шаром в розшарованому просторі, причому між сусідніми шарами існує інформаційний зв'язок через одну делокалізовану точку. В процесі створення Супер-Всесвіту був заповнений одновимірний Світ Поля-часу, потім заповнюється енергією і частинками Планка, які несуть в собі електричний і магнітний заряди, двовимірний (1+1) Світ. Завершення заповнення двовимірного Світу приводить до «переливання» енергії в сусідній тривимірний Світ – світ відомих кварків, які мають дробові електричні заряди, кольорові заряди і спіни. Наступним кроком є «переливання» енергії в чотиривимірний (3+1) Світ і народження частинок цього Світу. Еволюція цього Світу завершується створенням брани п'ятивимірного Світу. Запропонована модель підтримує антропний принцип у Всесвіті.

Ключові слова: Модель народження Всесвіту, розшарований простір, частинки Планка, антропний принцип.

Аннотация

В работе с использованием Закона подобия и Закона единства предложена модель создания и структуры Вселенной, в которой выполняются физические законы. Из модели следует, что наша Вселенная является частью Супер-Вселенной, отдельным слоем в расслоенном пространстве, причем между соседними слоями существует информационная связь через одну делокализованную точку. В процессе образования Супер-Вселенной сначала был заполнен одномерный Мир Поля-времени, затем заполняется энергией и частицами Планка, несущими в себе электрический и магнитный заряды, двумерный (1+1) Мир. Завершение заполнения двумерного Мира приводит к «переливанию» энергии в соседний трехмерный Мир – мир известных кварков, имеющих дробные электрические заряды, цветные заряды и спины. Следующим шагом является «переливание» энергии в четырехмерный (3+1) Мир и рождение частиц этого Мира. Эволюция этого Мира завершается созданием браны пятимерного Мира. Предложенная модель поддерживает антропный принцип во Вселенной.

Ключевые слова: Модель рождения Вселенной, расслоенное пространство, частицы Планка, антропный принцип.