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The Worlds on the Other Side of the Big Bang

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Abstract

Taking the Big Bang as an established fact, the question inevitably arises about what exactly caused it, what environment could it have happened and what happened before it. The developed approach allows us to shed light on many raised questions and establish what universal laws and structures formed what happened before the Big Bang, to understand its cause and the dynamic processes that led to it. This required a radical revision of many views, giving them a new meaning and content. This approach has led to a consistent and conceptually new understanding of these phenomena, which allowed correctly formulating of questions to which there are still no clear answers. Based on this formulation of the problem, we came to new ideas about the nature of Dark energy, Dark matter and the region of their birth, formulated and described the mechanism of the formation of worlds and their hierarchy on the other side of the Big Bang and the mechanism of this explosion itself. The Primary Parent Particle was introduced into the concept, which was the basis of everything and is the carrier of the fundamental Primary space introduced by us, which had at least two phase states. This particle consists of Beginnings united in the form of Borromeo rings. This made it possible to calculate the structure and primary spectrum of elementary particles that arose on the other side of the Big Bang, the mechanisms of their formation and the resulting fundamental interactions that lead to the existence of vortices before the Big Bang, and the mechanisms of the birth of multiple universes and much more are also considered. The concept of the "cosmic genetic code" is introduced, and the characteristics and mechanism of its formation before the Big Bang are presented.

Keywords

Big Bang, Primary Space, Worlds, Materiality, Primary Parent Particle, Borromeo Rings, "Dirac Sea", "Clumps" of Dark Energy, "Swaddled Triads", DNA of "Seeds of Creation"

1. Introduction

Modern cosmology is based on several firmly established experimental facts: the Hubble expansion [1], the isotropy of the relic radiation, the angular measurements of its anisotropy [2], and data on the cosmological nucleosynthesis of light nuclei [3]. These discoveries form our basic understanding of the early Universe and lead to the Big Bang theory and the hot birth of the Universe. Along with this, we observe the problem of a shortage of Baryonic Matter (BM) in galaxies from observations of rotation curves [4] [5] and besides its accelerated expansion of the Universe [6]. These observations characterize the later stages of the Universe's development, starting from the moment of the formation of its large-scale structure [7] and have no generally accepted explanation, within the framework of the standard cosmological model. In order to rationally explain the mass deficit in galaxies and the accelerated expansion of the Universe, cosmology has come to introduce concepts such as Dark Matter (DM) and Dark Energy (DE), the nature of which has not yet been established [8] [9]. From observations of the anisotropy of the relic radiation, it is obtained that the universe consists of:

$$\begin{aligned} &\Omega_{DE} = \rho_{DE}/\rho_C \sim 70\%\ \text{DE},\\ &\Omega_{DM} = \rho_{DM}/\rho_C \sim 25\%\ \text{DM},\\ &\Omega_{BM} = \rho_{BM}/\rho_C \sim 5\%\ \text{BM},\\ &\rho_C = 3H_0^2/8\pi\gamma, \end{aligned} \tag{1}$$

where ρ_{DE}, ρ_{DM} and ρ_B are the density of DE, DM and BM, ρ_C respectively, is the critical density of the Universe, γ is the gravitational constant and H_0 is the Hubble constant [2]. These data allow us to test the viability of various theories of the Universe formation, but at the same time, the question arises like an impregnable fortress: "What happened before the Big Bang"? In our opinion, without an answer to this question, it is impossible to get closer to understanding the essence of the Universe. In the chronicle of the birth of our Universe, there are 2 indisputable facts, taking into account which allows us to lift the veil over this amazing event:

1) The phenomenal energy that gave rise to the Big Bang (BB);

2) The Primordial matter, in the environment of which has happened BB.

It is obvious that the Primordial matter, before the emergence of BB in it, was a special world, about which we still have no idea. If we could understand its structure and the nature of the energy that gave rise to the BB in the Primary matter, the mystery of the formation of the Universe would be solved. But first, we need to answer a number of questions.

1) Is the birth of our Universe an accident or a pattern? If there is a pattern (and we will try to show it further), then we can talk about a certain code that forms universal cosmic laws, the birth and development of the Universe. These include the law of existence and the active interaction of neighboring worlds with different geometric and physical properties. Is there an understanding in the cosmology of such a possible interaction (and hence the existence) of neigh-

boring cosmic worlds, Higher and Lower? Can we claim, that if the Primary matter 13.8 billion years ago, it still exploded, which means that the world of this matter, being the Lower World, for some unknown reason come into dangerous interaction with the neighboring world of a larger dimension, that is, the Upper world, the presence of which science does not yet take into account.

2) From our concept, "on the other side of the BB", there was not only a Lower World (the BB world is the world of Primary Matter), but also another, Higher World, does this mean that the Lower World was embedded in the Upper world? A partial answer to this question is the Nash theorem [10] on embeddings of spaces of low dimensions into flat Euclidean spaces of higher dimensions. And although from a mathematical point of view, for arbitrary spaces, this question remained open, this does not mean that in nature this problem could not be solved in the same way as in flat Euclidean spaces.

3) Is there a cosmic principle that can explain the way the energies of the Higher and Lower Worlds can interact? Yes, this is the Principle of three Beginnings (forces, energies) [11], which states that any Phenomenon is always the result of the interaction of three Forces (Energies): active ("+"), passive ("−") and neutral ("0"). At the same time, the neutral force ("0") is the force of the Upper world, penetrating into the dual particles ("+" and "−") of the Lower World and interacting with them, creating a phenomenon that is perceived as a Phenomenon in the Lower World. The source of neutral Force ("0") belongs to the Higher World, but it can influence the Lower World, but not the opposite.

4) The Higher space (in our concept, the Beginning of the Beginnings) is not a mathematical abstraction, but a completely material Reality, which at the quantum level has no separation into space and matter. This absolute Unity is unchangeable, indivisible, containing the Beginnings of all Beginnings, the properties of all properties and the actions of all subsequent actions in the very germ of Nature, a kind of absolute Reality, something extra-spatial, unstrained, timeless, transcendent, exclusively by its nature capable of creating external phenomena where both space and time could be formed, and all the other phenomena, it was only necessary to set in motion their own, seemingly so unshakable, forces. But what elementary structures could exist in the space of the Beginning of the Beginnings? Such an element was its fundamental cell, a holistic, totally self-sufficient particle with an unimaginable number of potential possibilities. This is the Essence, since everything that could exist in the Universe was determined by this particle, which includes everything that is fundamentally possible in the Cosmos.

5) What energies dominated the space of the Beginning of the Beginnings? According to our concept, this is a form of movement of a special nature ("eternal motion"), which manifests itself dynamically in all the worlds of our universe, but in the Lower Worlds, part of this movement is lost, since it can manifest itself in the most complete way only in the Higher Worlds. The carriers of the energy of "eternal motion" were all three elements of a single cell, the main of which was the neutral "0", a particle of matter of "pure gravity", which became

not only the Main Dynamic Force, but also a Force capable to interact with any cosmic matter.

The second element—the positive particle ("+") have a natural property, the ability to create, to be a Great Force of Life, filling Everything with itself, and the third element—the negative particle ("−") contained a natural ability to charge any creation of the Cosmos with Intelligence. Since we know that the observable Universe was formed as a result of BB, the Lower World of Primary matters in which BB occurred and which we will further consider in detail was not just the Lower World. It was a "Transition" into our Universe. The BB was so powerful that it can be assumed that in this case, the process of creating the Phenomenon was not local, but Massive, affecting a huge amount of 30% (25% + 5%) from 100% of the Primary matter of the Lower World. The recognition of the existence of worlds "on the other side" of the BB allows us to take a fresh look at the essence of the Universe: why did the BB occur?; what Forces gave rise to this monstrous "transition"?; what properties did the Primary particles possess (let's call them "seeds of Creation")?; what code of creation and Self-deployment into the worlds of the early Universe was embedded in these particles?; what structures was the Field of the Universe formed and is it of the same quality in all worlds?; what elementary particles do Dark energy and Dark matter consist?; do the physical properties of Dark energy and Dark matter change depending on the properties of the cosmic worlds? We have tried to give answers to these and many other questions, justifying them in a more rigorous way.

The structure of our research work is organized as follows. After the introduction in Chapter 2, we begin by describing the nature of space that existed before the Big Bang, including its contents and various processes within it, and move on to the basic fundamental particle that it consists of. In Chapter 3, we explore the two phases of this space, and the processes and mechanisms of interactions that occur during the transition of the Primary Parent Particle between the two phases. In Chapter 4, we consider the Primary substrate arising from particles that were born in the medium after the phase transition. In Chapter 5, we explore the formation of triads, the special particles that formed the embryos of future universes. After that, in Chapter 6, we introduce the methodological part in which we show the formation of cosmological models in a homogeneous and isotropic medium, and then, in Chapter 7, we build inhomogeneous cosmological models. In Chapter 8, we review the mechanism of the Big Bang and estimate its energy, the mass of our universe and the probability of its occurrence. In the next Chapter 9, we review the cosmic code of the self-deployment Universe, its properties and main characteristics. Finally, in chapter 10 we formulate the main conclusions and results

2. O_{SP} Space and Its Nature

So, according to our concept, "on the other side of the BB", there was (and there is now) a SPACE, a kind of Higher World, within which billions of years ago the

Lower Worlds (future universes) were born, one of which is our Universe. Let's call this Higher World—O_{SP} space[1] and consider this world based on a minimal set of assumptions related to its possible nature. Physical properties of O_{SP} space are connected by the Primary Parent Particle from which it consists and everything is determined by this particle, which is a particle of everything. We suggest, that the Primary Parent Particle consists of three Borromeo rings, each of them is a carrier of the three Beginnings and determine everything that only can exist in a physical Reality. Stability of this particle include an unknown mechanism of its decay and several decay channels are possible, as a result of which the structure of a Primary Parent Particle in the input channel of the decay reaction falls apart along several output channels of collapse. Let's introduce convenient notations: $O_N \to S_N$, $O_A \to S_A$ and $O_P \to S_P$, where O_N is the ring-shaped Beginning in a Primary Parent Particle (conventionally designated by us as N neutral), and S_N is a Beginning, torn and presented in the form of a string. Similarly, we denote other Beginnings by introducing notations for their indexing A-active and P-passive, accordingly. Notating a Primary Parent Particle, with three Beginnings connected as Borromeo rings in as $O_{\{N,A,P\}}\big|_{BR}$, we can provide decay channels as follows:

$$O_{\{N,A,P\}}\big|_{BR} \to \begin{bmatrix} O_N + O_A + S_P \\ O_N + S_A + O_P \\ S_N + O_A + O_P \\ O_N + S_A + S_P \\ S_N + S_A + O_P \\ S_N + O_A + S_P \\ S_N + S_A + S_P \end{bmatrix}, \tag{2}$$

and for $O_{\{N,A,P\}}\big|_{BR}$ decay, we have only seven output channels. Note that $O_{\{N,A,P\}}\big|_{BR}$ connection of the Beginnings is not the only possible one, and in principle, there are other connections of these Beginnings: $O^{\{N\}}_{\{A,P\}}$, presented in Figure 1.

It is easy to see that the connection of Beginnings in the form $O_{\{N,A,P\}}\big|_{BR}$, are topologically different from the connection $O^{\{N\}}_{\{A,P\}}$ because in the 1-st case, all Beginnings are equivalent in this meaning, that there is no any leading Beginning and their connection are equal rights, it is worth uncoupling one, as the whole structure it will fall apart. In the 2-nd case, we see that the dominant Beginning is the O_N, it connects the other two Beginnings, which are not related to each other. For the configuration of $O^{\{N\}}_{\{A,P\}}$ type, also it is possible to decay by different channels:

$$O^{\{N\}}_{\{A,P\}} \equiv O^{\{N\}}_{\{P,A\}} \to \begin{bmatrix} \{O_N, O_A\} + S_P \\ S_N + O_A + O_P \\ \{O_N, O_P\} + S_A \end{bmatrix}. \tag{3}$$

[1] O_{SP} from the English word "Origin".

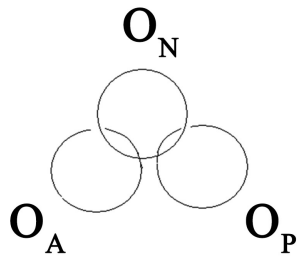

Figure 1. The configuration of the connection of the Beginnings, denoted as $O_{\{A,P\}}^{\{N\}}$.

Here, $\{O_N, O_A\}$ denotes Hopf Engagement of the N and A Beginnings. Of course, all this requires the expenditure of energy to break the existing ties carried out by the Beginnings themselves. The configuration of the connection similar to $O_{\{A,P\}}^{\{N\}}$, cannot be fundamental, most likely it is a derivative of its constituent Beginnings, the mechanism formation of which can be reproduced as "clashing", followed by "closing" of the free ends of the strings, as it is shown in **Figure 2**.

Collisions between particles—strings and rings, can form fantastically unusual configurations, for example, it is possible to wind a string on another string, followed by closing, as a result of which a structure is formed, spirally wound on a ring and closed with its ends[2]. We will get a construction, where one string is wound spirally onto another, while the second spiral closes, forming a circle. A string wound spirally around a circle can also twist, tying into a knot.

The interaction between structures formed from the decay products of a Primary Parent Particle can take completely unimaginable combinations, striking the imagination. Our task, in the future, is to build a one-to-one correspondence between these images and the actually observed elementary particles. Judging by the works, this is a solvable task, as for example, it is done in the work [12].

3. About O_{SP} Space Phases

Having described the geometric and physical properties of the O_{SP} space, having built a model of its constituent Primary parent particle, we proceed to the description of its global properties. Here, at the origins of EVERYTHING, various options are possible. We will focus on the model of the 2-phase state of O_{SP} space, or the "Cheese" model, as shown in **Figure 3**.

If we consider the phase separation boundary, then we have a picture when the embedded phase forms a space above the main phase of the condensate and at the same time, interpenetration is possible between them, by analogy with saturated steam over water. The Primary parent particles "packed" in the condensate[3] have unimaginable internal capabilities, unable to manifest them inside the condensate. Their "frenzied" internal dynamics is not manifested and in this

[2]In principle, this mechanism of interaction can explain the unobservability of naked quarks, since they bind, intertwining with strings during interaction.

[3]An analogue of the Dirac Sea in our Universe, but fantastically larger.

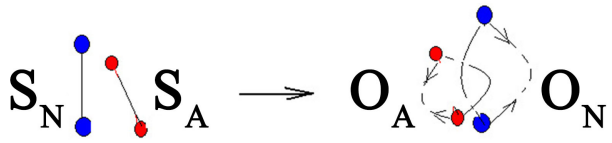

Figure 2. Formation of connected rings from collision and "clashing" of two strings S_N and S_A, carrying out the reaction of the formation of interlocked rings $O_N \cap O_A = O_{N \cap A}$.

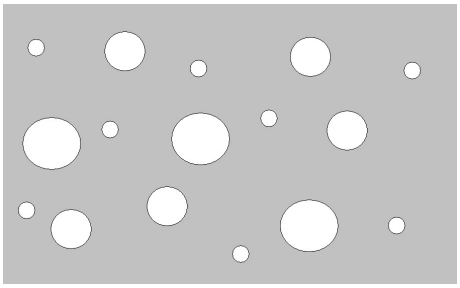

Figure 3. A two-phase model for O_{SP} space where the main phase is an analogue of the Dirac Sea, a condensate of Primary Parent Particles, with states of another phase embedded in this condensate, like bubbles in cheese.

sense, their creative possibilities have no way out. They can manifest themselves only in the second phase, where they can escape, freeing themselves from the "captivity" in the condensate. All the main dynamics of the manifestation of their capabilities are realized in the second phase, above the condensate. And here the question arises about how those particles and the environment that will become the environment for the formation of our Universe before the BB are born and formed from the Primary Parent Particles? Here, we should return to Relation (17), in which we have the channels of $O_{\{N,A,P\}}\big|_{BR}$ particle decay. Of all the decay channels, we will single out those that should have the greatest probability, since they require less energy, due to the fact that only one Borromeo ring is broken:

$$O_{\{N,A,P\}}\big|_{BR} \to \begin{bmatrix} O_N + O_A + S_P \\ O_N + S_A + O_P \\ S_N + O_A + O_P \end{bmatrix}. \tag{4}$$

Then, form a collection of particles is formed, fragments of decay a Primary Parent Particl

$$\{O_N, O_A, O_P, S_N, S_A, S_P\}. \tag{5}$$

Here, the states O_N, O_A, O_P form a triune family of "0", which we will denote as $O_N \to "0"_0$, $O_A \to "0"_+$ and $O_P \to "0"_-$. Also, the triune family is formed by S_N, S_A, S_P particles, for which we introduce the notation: $S_N \to S_0$, $S_A \to S_+$ and $S_P \to S_-$. The difference between family of $\{O_N, O_A, O_P\}$ and a family $\{S_N, S_A, S_P\}$ is that they are the same entities, but in different states, since $\{O_N, O_A, O_P\}$ they are a family of closed strings, and a family of $\{S_N, S_A, S_P\}$

strings with free ends.

Other channels of the decay of a Primary Parent Particle are less probable since the realization of these decay channels requires the rupture of two or three Beginnings in the Primary Parent Particle:

$$O_{\{N,A,P\}}\Big|_{BR} \to \begin{bmatrix} O_N + S_A + S_P \\ S_N + O_A + S_P \\ S_N + S_A + O_P \\ S_N + S_A + S_P \end{bmatrix}. \tag{6}$$

However, due to the fact that we have three particles in the output channel the velocity distribution[4] will already be uneven. But what is the mechanism of the decay of the ground states of a Primary Parent Particle? What makes it disintegrate? Here, we fundamentally lack any data, for obvious reasons. Consider a possible mechanism of the decay of a Primary parent particle in more detail.

3.1. The Mechanism of Decay of a Primary Parent Particle $O_{\{N,A,P\}}\Big|_{BR}$ -Interaction of Worlds

However, if we consider the condensate of the Absolute closer to the phase interface, then there such transitions can already be resolved in the near-surface condensate layer, near the phase interface. Also, considering the processes of evaporation from the condensate of the Absolute, we can obtain transitions of Primary Parent Particles into the space of the second phase. In the space of the second phase, additional channels for the formation of new particles are collisions and, in principle, the birth of waves at the interface of phases, which can also contribute to the transition of particles "packed" in the condensate into the space of the second phase. Moreover, we can allow quantum tunneling of particles between the spaces of the second phase. In fact, this means the mechanism of interaction between worlds that are formed in different "voids", the exchange of information between worlds formed in different "voids". Of course, if we initially consider multidimensional worlds that are at the origins of everything, then here, the phase diversity can be fundamentally different. However, such further development of the model is already predictable. Here we focus on the simplest case, which admits, if necessary, obvious generalizations. Thus, having found out the possible mechanism of transformation of the $O_{\{N,A,P\}}\Big|_{BR}$, particle forming the O_{SP} space, we can proceed to consider the interaction mechanisms that are induced by the appearance of decay fragments in the space of the second phase.

3.2. Interaction Mechanisms before BB

Particles born in the space above the sea of the Absolute induce new types of interactions, which, in the case of binary interactions, represent a matrix 6 × 6, as shown in **Figure 4**.

[4]Here, it should be understood that these are not ordinary speeds, but movements in O_{SP} space.

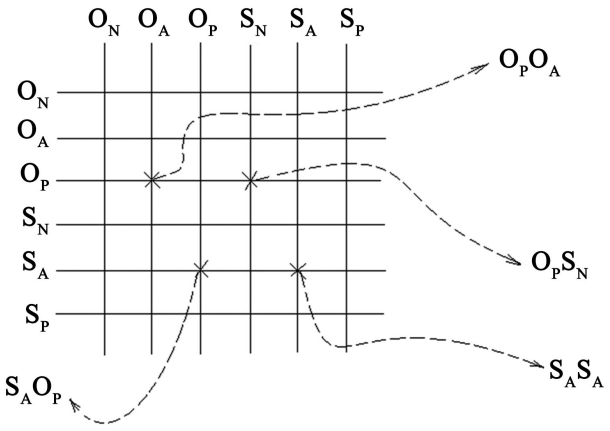

Figure 4. Matrix of binary interaction induced by fragments of the decay of a Primary Parent Particle.

Heavier particles, other than $O_{\{N,A,P\}}\big|_{BR}$, can exist in the condensate of the sea of the Absolute. The lightest ones are packed at the interface of this condensate. The nature of the particles located deep in the condensate and forming its deep region is still beyond our understanding. Their diversity can be immeasurably more complex in order to describe them by means of our Universe, since extracting them from condensate requires unattainable energies. These particles, for us, are an "unmanifested" Reality, a thing in itself, objectively existing, but incomprehensible to us, perhaps never. Here, we can raise the question of the energy depth of the sea of the Absolute and its physical meaning, expressed in terms of our Universe. Even the lightest of such particle, we cannot detect in direct observations. The heavier these particles are, the deeper their states are "immersed" in the condensate of the Absolute. Only the lightest part of these "packed" particles can "escape" from the condensate due to disturbances (in the form of waves colliding in this space) and become free. They are particles. The perturbation energy must be higher than the band gap in order for the particles to become free.

Thus, in the region outside the sea of the Absolute, we have the presence of $O_N, O_A, O_P, S_N, S_A, S_P$ particles that, interacting with each other, are able to create new configurations. To better understand and describe the dynamics of the interaction of these new particles, it will be convenient for us to introduce the concept of materiality, which we will characterize as the formation of new connections, characteristic only of worlds with a certain range of energies in them, but impossible in worlds where the characteristic energies are different. Consider the possible reactions of the particles formed in (5). Then we get:

$$\text{“0”}_0 + \text{“0”}_0 \leftrightarrow \begin{bmatrix} \text{“0”}_0 + \text{“0”}_0 \\ \text{“0”}_0 + S_0 \\ S_0 + S_0 \end{bmatrix}, \tag{7}$$

here, the collision of $\text{“0”}_0 + \text{“0”}_0$ leads either to their elastic scattering, or to reactions of inelastic interaction, when one or two strings are formed at the reac-

tion output. Also, reverse reactions are possible. Similarly, a $\text{“0”}_+ + \text{“0”}_-$ collision leads either to their elastic scattering, or to the formation of strings with free ends. Reverse reactions are also possible:

$$\text{“0”}_+ + \text{“0”}_- \leftrightarrow \begin{bmatrix} \text{“0”}_+ + \text{“0”}_- \\ \text{“0”}_+ + S_- \\ S_+ + \text{“0”}_- \\ S_+ + S_- \end{bmatrix}. \tag{8}$$

Particles, fragments of $O_{\{N,A,P\}}\big|_{BR}$ decay, during their collisions form a new materiality in space outside of the condensate of Absolute, which is formed from "0"_0, "0"_+, "0"_-, S_0, S_+ and S_- particles. These particles form primary “clumps” structures in O_{SP} space that are the embryos of other, emerging worlds. The birth of these particles leads to the appearance of interactions between them, and, accordingly, to the appearance of carriers of these interactions. The matrix of binary interaction between these particles looks as follows:

$$U_{ij} = \begin{pmatrix} \begin{bmatrix} O_{00} & O_{0+} & .....O_{0-} \\ O_{+0} & O_{++} & .....O_{+-} \\ O_{-0} & O_{-+} & .....O_{--} \end{bmatrix} & \begin{bmatrix} O_0S_0 & O_0S_+ & O_0S_- \\ O_+S_0 & O_+S_+ & O_+S_- \\ O_-S_0 & O_-S_+ & O_-S_- \end{bmatrix} \\ \begin{bmatrix} S_0O_0 & S_0S_+ & S_0O_- \\ S_+O_0 & S_+O_+ & S_+O_- \\ S_-O_0 & S_-O_+ & S_-O_- \end{bmatrix} & \begin{bmatrix} S_{00} & S_{0+} & .....S_{0-} \\ S_{+0} & S_{++} & .....S_{+-} \\ S_{-0} & S_{-+} & .....S_{--} \end{bmatrix} \end{pmatrix}, \tag{9}$$

where, for example, U_{11} defines the interaction between "0"_0 and "0"_0 particles folded in the form of loops-rings. This interaction has, at the quantum level, its own carriers of interaction. Similarly, U_{45} defines the interaction between S_0 and S_+ strings with free ends. This interaction also has its own carriers, the nature of which may be different from the nature of the carriers determined by the matrix element U_{11}, while we recall that the S_0 string is formed from the “break” of the loop "0"_0 and the S_+ string is formed from the “break” of the "0"_+ loop. Thus, in this approach, the approach of string theory and the theory of quantum loops converge. Quantum loops in this case are a more fundamental object, since strings are formed from them after the transition from the main phase to the non-main one.

Let’s consider the most general case when the carriers of binary interactions are completely different. Then, their number is determined by a combination of paired interactions between different and identical objects: $N_U = C_6^2 + 6 = 21$. But here, we understand that the number of interaction carriers can be much larger. So, for electromagnetic interaction, the photon γ quantum is the carrier. For the electroweak, we have 3 interaction carriers $W^{\pm}$ and Z^0. And for the interaction of quarks, the theory suggests 8 carriers of interaction, g gluons. At the same time, it is also possible that the interactions are identical and coincide between strings, between cycles, and between strings and cycles[5]:

[5]At high energies characterized of the Higher World, before BB.

$$U_{ij}^{(SS)} = U\left(S_i \leftrightarrow S_j\right);\ U_{ij}^{(OO)} = U\left(O_i \leftrightarrow O_j\right) \text{ и } U_{ij}^{(OS)} = U\left(O_i \leftrightarrow S_j\right). \quad (10)$$

Interaction matrix we can present as:

$$U_{ij} = \frac{1}{2}\left(U_{ij} + U_{ji}\right) + \frac{1}{2}\left(U_{ij} - U_{ji}\right) = \tilde{S}_{ij} + \tilde{A}_{ij}, \quad (11)$$

where $\tilde{S}_{ij} = \frac{1}{2}\left(U_{ij} + U_{ji}\right)$ is symmetric, and $\tilde{A}_{ij} = \frac{1}{2}\left(U_{ij} - U_{ji}\right)$ antisymmetric part, from where follows, that antisymmetric part $\tilde{A}_{ij}$ describe the vortex nature of the interaction, and symmetric part $\tilde{S}_{ij}$ its potential part. With that:

$$\boldsymbol{F}_{ij} = -\nabla U_{ij} \quad (12)$$

This reflects the local nature of the interaction between bodies that are and interact in the same world[6]. But this is not so obvious when interacting bodies belong to different worlds. Understanding this requires a broader and universal generalization of the concept of interaction, based not on the principle of dualism, but on the Principle of three Beginnings [11].

4. The Primary Substrate of the Worlds before BB

As a result of the previous consideration, we have obtained that O_{SP} space exists in two phases—the phase of "empty", unfilled with particles of space and in the phase of condensation of the sea of the Absolute. The carrier of this space is a particle $O_{\{N,A,P\}}\big|_{BR}$ representing the connection of three Principles, in the form of Borromeo rings, so that once one ring is disconnected, the whole structure crumbles. However, being tightly "packed" in the sea of the Absolute and possessing colossal internal energy, these particles cannot manifest their creative capabilities. As a result of the previous consideration, we have obtained that space exists in two phases—the phase of "empty", unfilled with particles of space and in the phase of condensation of the sea of the Absolute. The carrier of this space is a particle representing the connection of three Beginnings, in the form of Borromeo rings. However, being tightly "packed" in the sea of the Absolute and possessing colossal internal energy, these particles cannot manifest their creative capabilities. Only when released from the condensate, they begin to show their properties. Particles, fragments of decay, representing the Beginnings, form other particles in their binary interactions, generating new fields that characterize their interaction and at the quantum level have their carriers of these new fields.

Above, we showed that decay of Primary Parent Particle $O_{\{N,A,P\}}\big|_{BR}$ generate 6 particles in the form of three loops and three strings with free ends. They induce new fields, as a result of which, we have obtained an interaction matrix U_{ij}, which, due to the properties of symmetry, leads us to 21 final particles. Let's express all the particles that we have received in their natural hierarchy, according

[6]This is one of the manifestations of dualism, which is limited by the local nature of interaction operating in one world. The Principle of the three Beginnings expands the interaction to the possible influence on the phenomena of a Lower World, from Higher World.

to our concept:

$O_{\{N,A,P\}}\big|_{BR}$ —1 Primary Parent Particle;

O_N, O_A, O_P —3 particles, Beginnings ("packed");

$"0"_0$, $"0"_+$, $"0"_-$, S_0, S_+, S_- —6 particles, 3 loops and 3 strings, "unpacked".

Diagrams of binary interactions (see Figure 5 and Figure 6), gives us 12 particles, a carriers of binary fields. Between each other $"0"_0$, $"0"_+$ and $"0"_-$, these particles do not interact.

As a result, a set of 21 fundamental particles formed from a Primary Parent Particle $O_{\{N,A,P\}}\big|_{BR}$ was obtained. This Primary Parent Particle is fundamentally unobservable She is not among the 21. It exists only in the sea of the Absolute. Being the Source of everything, it must be internally unified and, at the same time, self-sufficient, embodying in itself in the form of an inseparable "alloy" all three Beginnings that characterize the fundamental qualities inherent in any dynamic process that gives rise to a phenomenon and are characterized by us as: active, passive and neutral. Then mathematically we can express this in the form of a relation:

$$\left|O_{\{N,A,P\}}\big|_{BR}\right\rangle = \frac{1}{\sqrt{3}}\left(|N\rangle + |A\rangle + |P\rangle\right), \tag{13}$$

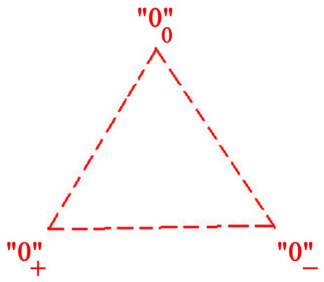

Figure 5. Diagram of interacting $"0"_0$ and $"0"_+$ particles.

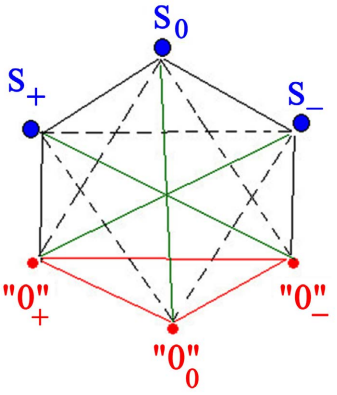

Figure 6. Diagram of 12 binary interacting fields for the $"0"_0$, $"0"_+$, $"0"_-$, S_0, S_+, S_- particles. Red lines non interacting particles.

where $|A\rangle$ is active, $|P\rangle$ is passive and $|N\rangle$ is neutral states of fundamental Beginnings, characterized by Borromeo rings (loops). Coefficients $\frac{1}{\sqrt{3}}$ characterized its equality, inside $O_{\{N,A,P\}}\Big|_{BR}$. We see that information, everything that determines the further course of events, a kind of cosmic genetic code, consists in a Primary Parent Particle, in the totality of those vibrations and internal degrees of freedom that determine it and everything for which it is the Source.

Thus, we have obtained the primary substrate, the minimum possible set of particles that is necessary to construct the entire observable diversity in the Universe and those laws that are embedded in a Primary Parent Particle as a universal cosmic Code for the birth and self-unfolding of universes. The following section is devoted to the formation of "clots"—the embryos in the environment in which universes are born.

5. The "Cradles" of Universes: Formation of Triads

A set of particles: $"0"_0$, $"0"_+$, $"0"_-$, S_0, S_+, S_-, obtained as a result of the decay of a Primary Parent Particle, due to the peculiarities of the kinematics distribution of the three partial decay, will have different velocity distributions and will be able to form bound states depending on their velocity relative to each other. We believe that S_0, S_+ and S_- particles lie lower in energy than $"0"_0$, $"0"_+$, $"0"_-$. Of them, in composition, proto clusters are possible, mainly consisting of: $\{S_0, S_+\}$, $\{S_0, S_-\}$ and $\{S_+, S_-\}$. At the same time, the lowest energy proto cluster: $\{S_+, S_-\}$, then $\{S_0, S_-\}$ and then $\{S_+, S_-\}$. These proto clusters make up a different kind of energy in composition, which we will call Dark Energy. The particles $"0"_0$, $"0"_+$, $"0"_-$, by own nature are more faster, less interacting between each other[7], and their masses are close to the zero:

$$E=\sqrt{(pc)^2+\left(mc^2\right)^2}=pc\sqrt{1+\left(\frac{mc}{p}\right)^2}=pc\left[1+\frac{1}{2}\left(\frac{mc}{p}\right)^2+\cdots\right]\approx pc. \quad (14)$$

In the approximation $\left(\frac{mc}{p}\right)^2 \ll 1$, hence, it follows that by their nature, they are like light with completely unique properties, having their own internal degrees of freedom in the form of colossal vibrations. The shining worlds formed by these particles are located much higher in energy, these are worlds formed from loops and their energies are so colossal that connected states are not formed in those worlds. These are the worlds of pure radiation and pure information, the carriers of which they are and which is enclosed in their internal degrees of freedom in the form of vibrations. The strings are formed from broken loops and some of the information in them is lost. The vibration spectrum of free strings differs from the vibrations in loops, for example: $"0"_+ \to S_+$ is equivalent to the condition that the loop, bursting, turns into a string:

[7]Because they are loops or Borromeo rings.

$$\underbrace{O \to \subset}_{loop \to string} \cdots \mapsto E\left("0"_i\right) \to E\left(S_i\right), \tag{15}$$

with free ends, where $i = \{0, +, -\}$.

Note that all this happens in "cavities" that are interspersed arbitrarily in the sea of the Absolute and their sizes can be immeasurably gigantic. The fact that proto clusters formed from a collection of string particles have different energies means that some are less hot and others are hotter. It takes less time to form these proto clusters than to form triads, which are special connections of strings and loops, which we will describe below. The peculiarity of this picture is that strings cannot penetrate into the world of "loops", but more energetic loops can penetrate into the worlds of lower energies and interact in these worlds with the particles forming them. The world of loops is inaccessible to the world of strings. But it is these proto clusters of strings that form Dark Energy that area the cradle of the universes in which they originate. But before we understand the mystery of the origin of universes in these proto clusters, let us turn to the triads, since their role in this process is decisive. Now that we have prepared everything necessary, let's remember the motive for starting this study. We started by defining the birth of the Universe as a Phenomenon. According to the Principle of three Beginnings, the birth of a phenomenon can only be in the presence of a 3rd force, which always comes from a world higher than the world of dual forces that are not able to generate a Phenomenon[8] [11]. However, the Principle of the three Beginnings cannot be formulated without introducing the concept of worlds and their division into higher and lower. Since BB is a fact, it requires the environment in which it occurred and the force, a kind of First Impulse that led to it. Following the logic based on the Principle of three Beginnings, we came to the existence of a Higher space, in relation to the space of our Universe. As a result, we came to the formation of "clumps" of primary strings, that is, the place where the future universe should originate. But what can serve in this case as the beginning of the process of origin? What should "fertilize" this clot and put all the necessary information in order for the process of conception, development of the embryo and its further birth to take place? These particles are $"0"_0$, $"0"_+$, $"0"_-$! These are particles from a Higher World and with richer information contained in them in the form of internal vibrations. Penetrating into the "clumps", these particles form triads, which can be represented collectively as: $\left\langle S_i \leftarrow "O_j" \to S_k \right\rangle$. We get a family of triads in proto clusters[9], but there must be some principle that would limit this diversity. We believe that the bound states of 3 inherently different Beginnings[10] are more preferable. Then, out of the set of ratios $\left\langle S_i \leftarrow "O_j" \to S_k \right\rangle$, only 3 combinations will remain:

$$\left\langle S_+ \leftarrow "O_0" \to S_- \right\rangle, \ \left\langle S_0 \leftarrow "O_+" \to S_- \right\rangle \text{ and } \left\langle S_0 \leftarrow "O_-" \to S_+ \right\rangle. \tag{16}$$

[8]Note that the Principle of three Beginnings has two aspects: from the point of view of the creation of the Cosmos, that is, within the framework of the mechanism of the birth of the Universe and from the point of view of its daily practical use in already built worlds.

[9]We allow such a variety, but it seems redundant at the moment.

[10]Various compounds are possible, but we believe that there are certain principles of prohibition that select more preferable some of them. This question is open for research.

We get that there are three types of proto-clusters in which three types of triads are formed. Proto-clusters from:

$$\begin{aligned} &\{S_+, S_-\} \Rightarrow \langle S_+ \leftarrow "O_0" \rightarrow S_- \rangle, \\ &\{S_0, S_-\} \Rightarrow \langle S_0 \leftarrow "O_+" \rightarrow S_- \rangle, \\ &\{S_0, S_+\} \Rightarrow \langle S_0 \leftarrow "O_-" \rightarrow S_+ \rangle. \end{aligned} \tag{17}$$

Triads in "clusters" form a core which consist from triads which at some conditions, explodes and is a source of colossal BB energy, giving rise to the birth of the Universe. The mechanism of the explosion itself, we will consider separately. Next, let's consider cosmological models that can be implemented in such a scenario, such as Friedman and different from them. It is interesting that completely unknown cosmological models of universes can be realized, which we present here for the first time. However, before proceeding to further exposition, we note that for triads we have identified three sets of particles: the states of the triads with high in binding energy: $\{"0"_0, S_+, S_-\}$, $\{"0"_+, S_0, S_-\}$ and $\{"0"_-, S_0, S_+\}$, which we will denote as: $1 \equiv S_+$, $2 \equiv S_-$ and $3 \equiv "0"_0$, depending on the case under consideration. At the same time, we do not exclude the case $\{S_0, S_+, S_-\}$, when three strings carrying different qualities are connected, but these are lower-lying states, since each loop loses part of its internal energy when it breaks. Then, the triads formed inside the "clots" from the Beginnings, which we denote as {("0"), "(+)", "(–)"}, they transform in a triad, connecting into one whole as {3, 1, 2}, acquiring part of each other's qualities. At the same time, the "clots" are carriers of DE, and the triads forming the triads core form DM[11].

6. Formation of the Uniform and Isotropy "Clots" of Dark Energy

In the previous section, we obtained that in the "cavities of the sea of the Absolute", "clots" are formed, the composition of which is determined by paired particles, in the environment of which triads are formed, described by the ratios (17). The properties of these local structures can affect the global characteristics of the formed clusters of "clots" and their dynamics. This section is of methodological interest, and we present as a simple demonstration of such an influence.

To form an environment of "clots", which consist of DE particles, in which BB occurred, birth and further "construction" of the Universe, there must be suitable conditions. The structures being formed should be stable for the time of their formation. To do this, it is necessary to calculate the critical mass of "clumps" consisting of a collection of particles "(+)" and "(–)". We will demonstrate this in the Jeans approach to describe the formation of galaxies in 3-dimensional space. In general case the space in which the "clumps" are formed is multidimensional.

Due to the great uncertainty of the studied factors of the formation of "clots" and the embryo of Primordial Matter consisting of triads, it is reasonable to as-

[11]We will talk about this in more detail in the section—the code of the self-depleting Universe.

sume that this formation occurs due to the gravitational and thermodynamic instability of the medium consisting of "(+)" and "(–)".

What role do the local characteristics of interaction between the components of the environment play in these processes? We apply, as an estimate, Jeans' theory on the formation of new structures from perturbations of the density of the medium [13]. The key point is that for small perturbations in a medium with density parameters $\rho = \rho_+ + \rho_-$ [12], pressure P, velocities $\boldsymbol{v}$ and gravitation potential ϕ, the linearized equations for perturbations of the density of matter will be written in the form:

$$\begin{cases} \dfrac{\partial \delta\rho}{\partial t} + \rho \cdot div\delta\boldsymbol{v} = 0 \\ \dfrac{\partial \delta\boldsymbol{v}}{\partial t} + \dfrac{v_S^2}{\rho}\nabla\delta\rho + \nabla\delta\phi = 0 \\ \Delta\delta\phi = 4\pi\gamma\delta\rho \end{cases}, \tag{18}$$

where $v_S^2 = \mathrm{d}P/\mathrm{d}\rho$ is a speed of sound in the medium, γ—gravitation constant[13]. From the system of differential Equation (18), for the density perturbation of matter $\delta\rho$ we have:

$$\frac{\partial^2 \delta\rho}{\partial t^2} = v_S^2 \Delta\delta\rho + 4\pi\gamma\rho\delta\rho\,. \tag{19}$$

The solution, in this case, can be find in the form: $\delta\rho \sim \exp\left[i\left(\boldsymbol{kr} - \omega\cdot t\right)\right]$ and substituting this expression in to (19) we obtain a dispersion relationship:

$$\omega^2 = k^2 v_S^2 - 4\pi\gamma\rho\,. \tag{20}$$

Whence it follows that there is a critical value of the magnitude of the wave vector:

$$k_J = \sqrt{\frac{4\pi\gamma\rho}{v_S^2}}\,. \tag{21}$$

At the values $k > k_J$ we will get the propagation of sound waves (or sound vibrations) in the medium, and when $k < k_J$, exponential growth of matter density perturbations. Thus, a simple consequence of Jeans theory is that density perturbations with a wavelength greater than the Jeans parameter $\lambda > \lambda_J = \dfrac{2\pi}{k_J}$, they grow and lead to the formation of clots in the medium under consideration.

Masses[14] the resulting structures—"clumps", in 3-dimensional space, is equal to:

$$M_J = \frac{4}{3}\pi\rho\left(\frac{2\pi}{k_J}\right)^3 \to \frac{32\pi^4\rho}{3}\left(\frac{v_S^2}{4\pi\gamma\rho}\right)^{\frac{3}{2}}. \tag{22}$$

Even this simple consideration shows the importance of local properties and

[12]We can separately consider density perturbations for "(+)" and "(–)" components of the medium, generalizing.

[13]In the high dimensional case γ can differ from the gravitation constant of classical Newton theory of gravity.

[14]Jeans mass.

their influence on the formation of structures—"clumps" (the equation of state for this medium $P = P(\rho)$ determines the speed of sound in it and the nature of the sound vibrations that occur). From the latter relation, taking into account the fact that $v_S \le c$, where c is the speed of light, we get an estimate for the upper limit of the mass of the formed clumps:

$$M_J = \frac{4\pi^{\frac{5}{2}} \cdot v_S^3}{3\gamma}\sqrt{\frac{\rho}{\gamma}} \le \frac{4\pi^{\frac{5}{2}} \cdot c^3}{3\gamma}\sqrt{\frac{\rho}{\gamma}}. \tag{23}$$

Jeans theory is based on Newton's theory of gravity, but most significant disadvantage of this theory is that it does not take into account the expansion of the medium in which the perturbation is formed. In the more developed Bonnor theory [14], the problem of the development of perturbations of the density of matter in an expanding medium is considered. In this case, undisturbed solutions are taken as:

$$\rho = \rho(t);\ \ \boldsymbol{v} = H(t)\boldsymbol{r};\ \ P = P(t);\ \ \phi = \frac{2\pi\gamma}{3}\rho(t)r^2, \tag{24}$$

here $H(t)$ is Hubble parameter, connected with matter density by following expression:

$$\frac{\mathrm{d}\rho}{\mathrm{d}t} + 3H\rho = 0;\ \ \frac{\mathrm{d}H}{\mathrm{d}t} + H^2 + \frac{4}{3}\pi\gamma\rho = 0. \tag{25}$$

Using the linearization procedure of Equation (25), we obtain for the parameters of the density perturbation $\delta\rho$ of the medium:

$$\frac{\partial\delta\rho}{\partial t} + 3H\delta\rho + \rho\cdot div\delta\boldsymbol{v} = 0, \tag{26}$$

$$\frac{\partial\delta\boldsymbol{v}}{\partial t} + H\cdot\delta\boldsymbol{v} = -\frac{v_S^2}{\rho}\nabla\delta\rho - \nabla\delta\phi. \tag{27}$$

Choosing a dimensionless variable $\delta = \frac{\delta\rho}{\rho}$, we can to write:

$$\frac{\partial^2\delta}{\partial t^2} + 2H\frac{\partial\delta}{\partial t} + \left(v_S^2k^2 - 4\pi\gamma\rho\right)\delta = 0. \tag{28}$$

From this equation, as was previously obtained in (19), it follows that the growth of perturbations of the density of the medium in which the formation of "clots" occurs depends on the speed of sound and, consequently, on the equation of state of this medium. At non-relativistic temperatures, in the approximation of an ideal gas, we obtain from the condition of local thermodynamic equilibrium: $P = \frac{\rho}{m}k_BT \to v_S^2 = \frac{\mathrm{d}P}{\mathrm{d}\rho} = \frac{k_BT}{m} = \frac{P}{\rho}$, where m is the molar mass of the medium in which the formation of clots occurs. Here, v_S is a Newtonian expression for the speed of sound in an ideal gas medium, which does not take into account temperature changes during the formation of inhomogeneous disturbances. In the case, when it is necessary to take into account the temperature change, during the formation of condensation and rarefaction processes in the

medium, the expression for the speed of sound will be written in Laplace form: $v_S^{(L)} = v_S\sqrt{\gamma_A}$, where γ_A is the adiabatic index. If we consider the space of zeroes "0", then it should be light-like and adiabatic index of the medium of zeroes is $\gamma_A = 4/3$.

These examples show that the growth of perturbations in the density of matter strongly depends on its local thermodynamic properties, composition, rate of active transformation reactions, etc. Thus, we see that the role of reactions characterizing the interaction in the formation of primary structures-clots of the medium is decisive. These properties is the key point in the formation of primary structures—"clumps" of "(+)" and "(–)" in an environment consisting from "0"[15].

Such consideration of the formation of "clumps" is true for a homogeneous Universe of the Friedman type, however, it is possible to create out a whole class of universes of an inhomogeneous type.

7. Inhomogeneous Cosmological Models of "Clots"

The kinematic manifestation of dynamics in a "clot" is its scale factor $a(t)$, where t is the time determined in the accompanying frame of reference associated with the observer. In the "clot" space, one can also introduce the Hubble constant, as $H = \frac{\dot{a}}{a}$, where $\dot{a} = \frac{\mathrm{d}a}{\mathrm{d}t}$. But these parameters are model-dependent. The study of inhomogeneous cosmological models is of interest. Let us construct an inhomogeneous, but isotropic cosmological model of "clumps", in the spirit of the works [15] and consider the main prerequisites for such an approach. In [16], it is believed that Einstein's equations are macroscopic equations of the gravitational field and the procedure for averaging them is not necessary [15]:

$$\left\langle R_\mu^\nu(g)\right\rangle - \frac{1}{2}\delta_\mu^\nu\left\langle R(g)\right\rangle = \frac{8\pi\gamma}{c^4}\left\langle T_\mu^\nu(micro)\right\rangle. \tag{29}$$

And we come to the equations:

$$R_\mu^\nu(\bar{g}) - \frac{1}{2}\delta_\mu^\nu R(\bar{g}) + C_\mu^\nu(\bar{g}) = \frac{8\pi\gamma}{c^4}T_\mu^\nu(macro), \tag{30}$$

where $\bar{g}$ is the macroscopic averaged metric of the tensor $g_{\mu\nu}$, T_μ^ν, is the energy-momentum tensor of matter, and $C_\mu^\nu(\bar{g})$ is the tensor field of correlation fields arising as a result of the averaging procedure in the "clot" space. Questions immediately arise: taking into account the topology of space $C_\mu^\nu(\bar{g}, \text{topology})$, we need to study the structure of field equations and stability of their solutions.

Here, we have a question about the averaging procedure itself, because the scale of averaging cannot be a universal parameter. There also remains an open the question of the influence of the topology of space. We will also note that if the characteristic size of the averaging region is, then it is reasonable to assume

[15]We do not exclude that the equation of state of the medium may look like the Van der Waals equation of state, and then a phase transition is possible for states between the critical points of its isotherms.

that the contribution to the integral characteristic will depend on the scale of fluctuations in the field parameters in the region under consideration. It is clear that small-scale fluctuations will be extinguished at the averaging scales and the main contribution will be fluctuations at distances of the order of the scale of the averaged region. This issue requires detailed consideration in the case of turbulent fields, which can play a significant role in the early stages of the formation of the "clots" structure, and the question of the scale of averaging remains open, since in this case, fluctuations are equally likely to occur on any scale of space and time. In [15], correlation fields are presented as:

$$C_{\mu}^{\nu}\left(\overline{g}\right)=C_{\mu(0)}^{\nu}\left(\overline{g}\right)+C_{\mu(1)}^{\nu}\left(\overline{g}\right)+C_{\mu(2)}^{\nu}\left(\overline{g}\right)+\cdots, \tag{31}$$

that is a decomposition of the correlation field that occurs at averaging by degrees of scalar curvature, and the terms are equal, respectively:

$$C_{\mu(0)}^{\nu}\left(\overline{g}\right)=\Lambda\cdot\delta_{\mu}^{\nu};\;\; C_{\mu(1)}^{\nu}\left(\overline{g}\right)=A\cdot R_{\mu}^{\nu}\left(\overline{g}\right)+B\cdot R\cdot\delta_{\mu}^{\nu}, \tag{32}$$

and $C_{\mu(2)}^{\nu}\left(\overline{g}\right)$ is expressed as [15]:

$$\begin{aligned}C_{\mu(2)}^{\nu}\left(\overline{g}\right)=&a\cdot R\cdot R_{\mu}^{\nu}\left(\overline{g}\right)+b\cdot R_{\mu\beta}^{\nu\alpha}\cdot R_{\alpha}^{\beta}+c\cdot R_{\mu}^{\alpha}\cdot R_{\alpha}^{\nu}\\&+d\cdot R_{\mu\alpha\beta\gamma}\cdot R^{\nu\alpha\beta\gamma}+e\cdot R^{2}\cdot\delta_{\mu}^{\nu}+f\cdot R_{\beta}^{\alpha}\cdot R_{\alpha}^{\beta}\cdot\delta_{\mu}^{\nu}\\&+g\cdot R_{\alpha\beta\gamma\delta}\cdot R^{\alpha\beta\gamma\delta}\cdot\delta_{\mu}^{\nu}+C\cdot R_{;\mu}^{;\nu}\cdot+D\cdot R_{\mu;l}^{\nu;l}+E\cdot R_{;m}^{;m}\cdot\delta_{\mu}^{\nu}\end{aligned}. \tag{33}$$

Here, we put for the simplicity, that $C_{\mu;k}^{\nu}=0$. Expression $C_{\mu(2)}^{\nu}$ can be obtained from the variation of the action $S=\int\mathrm{d}^{4}x\sqrt{-\overline{g}}L\left(\overline{g}\right)$, where $L=L\left(R,R_{\alpha}^{\beta}R_{\beta}^{\alpha},R_{\alpha\beta\gamma\delta}R^{\alpha\beta\gamma\delta},\cdots\right)$ and the variable parameters of the Lagrangian are the invariants of the Riemann curvature tensor. Then, the equations of the gravitational field will take the form:

$$R_{\mu}^{\nu}\left(\overline{g}\right)-\frac{1}{2}\delta_{\mu}^{\nu}R\left(\overline{g}\right)+\Lambda\delta_{\mu}^{\nu}+C_{\mu(1)}^{\nu}\left(\overline{g}\right)+C_{\mu(2)}^{\nu}\left(\overline{g}\right)=\frac{8\pi\gamma}{c^{4}}T_{\mu}^{\nu}\left(macro\right). \tag{34}$$

The study of the resulting field equation in full is rather cumbersome, and we will focus on some special cases that, nevertheless, may be of physical interest. To do this, assume that: $C_{\mu(1)}^{\nu}\left(\overline{g}\right)=0$, and also $a=b=c=d=f=0$, then we obtain:

$$\begin{aligned}&R_{\mu}^{\nu}\left(\overline{g}\right)-\frac{1}{2}\delta_{\mu}^{\nu}R\left(\overline{g}\right)+\Lambda\delta_{\mu}^{\nu}+d\left[R_{\alpha\beta\gamma\delta}R^{\alpha\beta\gamma\delta}\delta_{\mu}^{\nu}-2R_{\mu\alpha\beta\gamma}R^{\nu\alpha\beta\gamma}\right]+Q_{\mu}^{\nu}\left(\overline{g}\right)\\&=\frac{8\pi\gamma}{c^{4}}T_{\mu}^{\nu}\left(macro\right),\end{aligned}, \tag{35}$$

here $Q_{\mu}^{\nu}\left(\overline{g}\right)=C\cdot R_{;\mu}^{;\nu}\cdot+D\cdot R_{\mu;l}^{\nu;l}+E\cdot R_{;m}^{;m}\cdot\delta_{\mu}^{\nu}$. Let's to consider the metric $\overline{g}_{\mu\nu}$ in the form:

$$\mathrm{d}s^{2}=-\overline{g}_{\mu\nu}\mathrm{d}x^{\mu}\mathrm{d}x^{\nu}=c^{2}\mathrm{d}t^{2}-a^{2}\left(t\right)\left[\mathrm{d}r^{2}+\sigma^{2}\left(r\right)\mathrm{d}\Omega\right], \tag{36}$$

where for $\sigma\left(r\right)$ we have:

$$\sigma\left(r\right)=\begin{bmatrix}\sin\left(r\right), & \left(k=1\right),\\ r, & \left(k=0\right),\\ sh\left(r\right), & \left(k=-1\right).\end{bmatrix}. \tag{37}$$

Taking into account the expression for the interval, expressing the invariants

of the curvature tensor through the scale factor $a(t)$, we come to the equation[16]:

$$\left(\dot{a}^2 + a\cdot\ddot{a} + k\cdot c^2\right) - \frac{2\alpha}{\sqrt{3}}\left[(a\cdot\ddot{a})^2 + \left(\dot{a}^2 + k\cdot c^2\right)^2\right]^{\frac{1}{2}} = \frac{1}{2}a^2\left(\frac{1}{3}\varepsilon^* - p^*\right), \quad (38)$$

where we introduced notations: $\varepsilon^* = \frac{8\gamma\pi}{c^4}\varepsilon + \Lambda$, $p^* = \frac{8\gamma\pi}{c^4}p - \Lambda$ and $\alpha = d\sqrt{R_{\alpha\beta\gamma\delta}R^{\alpha\beta\gamma\delta}}$. If we introducing a new variable η: $c\mathrm{d}t = a(\eta)\mathrm{d}\eta$, the last equation will be rewritten as:

$$\left(a^{''}\cdot a + k\cdot a^2\right) - \frac{2\alpha}{\sqrt{3}}\left[\left(a^{''}\cdot a - \left(a^{'}\right)^2\right)^2 - \left(\left(a^{'}\right)^2 + k\cdot a^2\right)^2\right]^{\frac{1}{2}} = \frac{a^4}{6\cdot c^2}\left(\varepsilon^* - 3p^*\right) \quad (39)$$

We have obtained the equations of the gravitational field, the parameter $\alpha = L/R$ is the ratio of the characteristic length of the inhomogeneity to the maximum radius of the world, and the value $k = \{\pm 1, 0\}$, depending on whether the cosmological model. Let's find an analytical solution of this equation. Consider the case of an isotropic, inhomogeneous planar cosmological model, in the quasi-relativistic case when: $\Lambda \neq 0$: $\varepsilon^* - 3p^* = 0 \to \frac{2\pi\gamma}{c^4}(\varepsilon - 3p) = -\Lambda$. In the case of a flat cosmological model $k = 0$, the equation for the scale factor has the form:

$$a^{''}\cdot a - \frac{2\alpha}{\sqrt{3}}\left[\left(a^{''}\cdot a - \left(a^{'}\right)^2\right)^2 + \left(a^{'}\right)^4\right]^{\frac{1}{2}} = 0. \quad (40)$$

Discarding the trivial solution $a^{'} = 0$, after simple transformations, we come to the form:

$$\left(1 - \frac{4\alpha^2}{3}\right)\left(\frac{a^{//}}{a^{/}}\right)^2 + \frac{8\alpha^2}{3}\left(\frac{a^{/}}{a}\right)^{/} = 0, \quad (41)$$

and making a substitution $\frac{a^{/}}{a} = \mathrm{e}^f$, we come to the equation:

$\left(y^{/}\right)^2 + (\lambda - 2)y^{/} + 1 = 0$, where $\lambda = \frac{8\alpha^2}{3 - 4\alpha^2}$ and $y = \mathrm{e}^{-f}$. Then we get that: $y^{/}_{1,2} = \frac{-(\lambda - 2) \pm \sqrt{(\lambda - 2)^2 - 4}}{2}$. Having done all the necessary calculations, will eventually get:

$$a(t) = \begin{bmatrix} a_0\left(\frac{\sqrt{1-\beta}t - 1}{\sqrt{1-\beta}t_0 - 1}\right)^{\sqrt{1-\beta}} \\ a_0\left(\frac{\sqrt{1-\beta}t + 1}{\sqrt{1-\beta}t_0 + 1}\right)^{-\sqrt{1-\beta}} \end{bmatrix}. \quad (42)$$

Here $\beta = 1 - \frac{4\alpha^2}{3 - 4\alpha^2}$. Having that: $\sqrt{1-\beta} = \frac{2\alpha}{\sqrt{3}}\frac{1}{\sqrt{1 - \left(\frac{2\alpha}{\sqrt{3}}\right)^2}}$, we will finally

[16]Here, we have omitted simple but cumbersome calculations, following the work [15].

write down:

$$\frac{a_1(t)}{a_0}=\left(\frac{\frac{2\alpha}{\sqrt{3}}t-\sqrt{1-\left(\frac{2\alpha}{\sqrt{3}}\right)^2}}{\frac{2\alpha}{\sqrt{3}}t_0-\sqrt{1-\left(\frac{2\alpha}{\sqrt{3}}\right)^2}}\right)^{\frac{2\alpha}{\sqrt{3}}\frac{1}{\sqrt{1-\left(\frac{2\alpha}{\sqrt{3}}\right)^2}}},$$

$$\frac{a_2(t)}{a_0}=\left(\frac{\frac{2\alpha}{\sqrt{3}}t+\sqrt{1-\left(\frac{2\alpha}{\sqrt{3}}\right)^2}}{\frac{2\alpha}{\sqrt{3}}t_0+\sqrt{1-\left(\frac{2\alpha}{\sqrt{3}}\right)^2}}\right)^{-\frac{2\alpha}{\sqrt{3}}\frac{1}{\sqrt{1-\left(\frac{2\alpha}{\sqrt{3}}\right)^2}}}. \quad (43)$$

Assuming, for simplicity, that the value $t_0=0$, the last relations will take the form:

$$\frac{a_1(t)}{a_0}=\left(\frac{-\frac{2\alpha}{\sqrt{3}}t+\sqrt{1-\left(\frac{2\alpha}{\sqrt{3}}\right)^2}}{\sqrt{1-\left(\frac{2\alpha}{\sqrt{3}}\right)^2}}\right)^{\frac{2\alpha}{\sqrt{3}}\frac{1}{\sqrt{1-\left(\frac{2\alpha}{\sqrt{3}}\right)^2}}}, \quad (44)$$

$$\frac{a_2(t)}{a_0}=\left(\frac{\frac{2\alpha}{\sqrt{3}}t+\sqrt{1-\left(\frac{2\alpha}{\sqrt{3}}\right)^2}}{\sqrt{1-\left(\frac{2\alpha}{\sqrt{3}}\right)^2}}\right)^{-\frac{2\alpha}{\sqrt{3}}\frac{1}{\sqrt{1-\left(\frac{2\alpha}{\sqrt{3}}\right)^2}}}. \quad (45)$$

8. Big Bang

Let's consider the processes that can contribute to the emergence of BB. In our concept, the energy of BB can arise during the decay of triads formed inside the "clot" and if these are time-inconsistent decays inside the triad nucleus-embryo, then the amount of energy released per unit of time will not be so effective as to lead to the formation of the Universe. For the effectiveness of BB, it is necessary that all decays occur simultaneously or in a very short period of time $\Delta\tau$. The ratio of the mass of the nucleus-embryo to the mass of the entire "clot" inside which it is formed should be approximately close to 30%, as follows from experimental data between DM and baryonic matter to DE [2]. The decay leading to BB indicates the chain nature of reactions and the probability of such decay can be estimated[17].

Based on the chain nature of decay, the number of formed triads, per unit of

[17]If the decay phase of all triads coincides, this probability can be estimated as $P_\tau \sim \left(\frac{\Delta\tau}{\tau_T}\right)^{N_T}$, where $\Delta\tau$ is a duration of decay, and N_T—the number of triads in the triad nucleus is the embryo and τ_T is lifetime of nucleus consisting from triads, formed in the clot. This probability, in principle, can lead to an estimate of the frequency of the birth of universes in O_{SP} space in general.

time, is proportional to N_0 —their initial value, and the rates of branching and breaking of reaction chains for triads, respectively, let them be equal: α_T and β_T, from where we get that the equation of kinetics, for triads, taking into account branching and breaking of chains, looks like [17]:

$$\frac{\mathrm{d}n}{\mathrm{d}t} = (\alpha_T - \beta_T) n, \tag{46}$$

from where the solution of triads at the initial moment, will be written as:

$$n(t) = N_0 \cdot \exp\left[(\alpha_T - \beta_T) t\right]. \tag{47}$$

If in one act of a chain reaction, an amount of energy ε_0, is released, and the volume of the formed nucleus of triads is equal V_T, then the total energy of the BB will be written:

$$\varepsilon_{BB} \approx \varepsilon_0 n(\tau) V_T = \varepsilon_0 V_T N_0 \exp\left[(\alpha_T - \beta_T)\tau\right], \tag{48}$$

here τ —the duration of nucleus of triads explosion time[18].

Let's estimate the BB energy, based on the available data obtained from studies of the anisotropy of the relic radiation spectrum [2]. Knowing the time that has passed since BB $t_M \approx 1.38 \times 10^{10}$ years, it is easy to determine the event horizon of the Universe $R_M = c \cdot t_M$ and then, based on the value of the critical density $\rho_C = \frac{3H_0^2}{8\pi\gamma}$, we write that the mass of the Universe M_{Un} is:

$$M_{Un} = \frac{4}{3}\pi\rho_c R_M^3 = \frac{H_0^2}{2\gamma} c^3 t_M^3 \approx 2.73 \times 10^{67}\ \mathrm{g}, \tag{49}$$

which seems reasonable, considering that the mass of the Sun is $M_{Sun} \approx 2 \times 10^{33}$ gram, and the mass of our Galaxy is $M_G \approx 6 \times 10^{42}$ gram. This estimate seems quite plausible, since in our Universe, in the volume of its radius, there are approximately ~10^{25} galaxies similar to ours. Accordingly, the number of stars in the Universe is approximately ~3×10^{34}.

Assuming, for a rough estimate, that the kinetic energy of the motion of objects in the Universe is the difference in the mass defect of the triad nucleus, we obtain:

$$\varepsilon_{BB} = \Delta M c^2 = (M_T - M_{Un}) c^2 \approx 2\pi\rho_c H_0^2 \int_0^{R_M} r^4 \mathrm{d}r = \frac{3}{10} M_{Un} (H_0 R_M)^2, \tag{50}$$

where M_T is the mass of the triad nucleus formed inside the clot. This is a rough estimate, where the pecular velocities of the galaxies are not taken into account, but only the movement due to the Hubble expansion, which may be a consequence of not only BB, but also additional acceleration due to DE. Also, other factors are not taken into account, including the energy of magnetic fields, radiation, interstellar gases, etc., which may increase our estimate for $\varepsilon_{BB} \approx 4.6 \times 10^{91}$ MeV. Then, from Relations (49) and (50), we get that the mass of the triad nucleus:

$$M_T \approx \left(1 + \frac{3}{10}(H_0 t_M)^2\right) M_{Un} \approx 1.00293 \cdot M_{Un}. \tag{51}$$

[18]We will estimate the value τ -time of BB from other considerations, see Relation (52).

Using Relations (48) and (50), the time of BB τ is:

$$\tau \approx \frac{1}{\alpha_T - \beta_T} \ln\left\{\frac{3}{10}\frac{\left(H_0 R_M\right)^2}{N_0 \varepsilon_0 V_T} M_{Un}\right\}. \tag{52}$$

9. Self-Deployment Code of the Universe

According to our concept, the most important event took place in the Lower World, for which it was created, namely, the birth of "seeds of Creation" or, in other words, the birth of "swaddled" triads (1, 2, 3), the Primary matter of the future Universe. How did it happen?

Everything happened at the moment when the Zeros ("0") of "pure gravity" penetrated from the Upper World into the matter of the Lower World and 30% of particles consisting of "0", "+" and "−" appeared in the center of the "clumps" of the Lower World. These particles suddenly acquired the energy of a monstrous internal dynamism, to contain which new energy of bonds arose-"bonds" between "0", "+" and "−".

The energy of the bonds-"staples" allowed for a very short time "before the Big Bang" to preserve these particles as a Single, Indivisible Whole, and the close interaction of elementary particles inside a closed space created conditions for an unhindered transition of the energies "0", "+" and "−" into each other. This radically changed the quality of the particles, turning them into special, "swaddled" triads (1, 2, 3), the so-called "seeds of Creation", capable of further transformation, the Big Bang and the construction of the currently observed Universe.

The "seeds of Creation" were encoded in the form of a system of symbols (numbers) for storing, converting and transmitting the information embedded in these signs [18].

9.1. Code as a Way of Storing Information

Triads (1, 2, 3) included information about three Beginnings (Forces, Energies) and three connections ("staples").

Information about three Beginnings (Forces, Energies).

The main Force in the triads ("0", 3) personified a colossal dynamism, which subsequently allowed:

1) To carry out the Big Bang;

2) To create matter (force, energy) as a Form of Movement of a Special Nature, in essence, it is "perpetual motion", the energy that easily moves in outer space at any distance, for billions of years without additional "recharging".

In addition, this Force ("0", 3) had an incredible ability to unite, (integrate) matter, and deform space, creating prerequisites for subsequent construction:

1) Field of spaces and structures of multidimensional worlds;

2) Galaxies and other baryonic matter of the Universe.

The force ("+", 1) stored information related to the ability to create, fill with life and the meaning of the existence the baryonic matter of the worlds of the

Universe.

The force ("–", 2) contained information about how to fill cosmic matter with a mind, a conscious principle. It is important to note that each of the 3 forces in the "seeds of Creation" possessed not only its own, originally set, natural properties, but also two others acquired as a result of the action of the "triad's democracy"[19].

9.2. Information about Three Bonds ("Staples")

Three bonds—"staples" of the "seeds of Creation" contained two types of encoded information:

1) A way to participate in the creation of primary indivisible "atoms"-"bricks" for the construction of baryonic matter of a world of the Universe after the Big Bang;

2) A mechanism for regulating the fantastic velocities of cosmic energies as a way of forcing a change in the frequency of vibrations and establishing a different measure of time in the matter of the worlds of the Universe after the Big Bang.

Collectively, the "seeds of Creation" stored information:

- About the unimaginably huge, but smoothly working mechanism of the Creation of the Universe, in which:

1) 70% of the array of the "clot" of the matter of the Lower World can be identified with the "General Structural Basis", the "conditionally fixed part", the "frame" of any earthly mechanism;

2) The energy of the Big Bang is compared with the "given Initial Motion", "primary pulse";

3) Shining Streams of Integrating matter /3 (1, 2)/,/3 (2, 1)/, delivering energy to the "cores" of galaxies (future Black holes) are identical with the "Input Leading Links" of the earth mechanism;

4) And the creation itself—galaxies, giant stars, yellow dwarfs, planets, etc. can be imagined as "Output links", "The Driven part of the Mechanism".

- About the general principles, laws, rules, methods and conditions that contribute to the harmonious and such reasonable existence of our, and, apparently, many other universes.

9.3. Code as an Information Conversion System

Embedded in the triad (1, 2, 3), contained information adequate to the tasks of the creation of the Universe after the Big Bang. In particular, with its help, 2 main abilities were realized:

1) Transformations into the 6 types of Dark Matter:

- {3 (1, 2), 3 (2, 1)}—Integrating Dark Matter (IDM);
- {1 (3, 2), 1 (2, 3)}—Creative Dark Matter (CDM);
- {2 (1, 3), 2 (3, 1)}—Intelligent Dark Matter (InDM).

[19]See Relationship (13).

2) Self-deployment into the worlds of the observable Universe, creating Primary elementary "atoms"-"bricks" of different worlds [18].

9.4. Code as a Way of Transmitting Information

Personified the presence of "Eternal" vibrations of cosmic energies of different speeds and transcendence (self-sufficiency). At the same time, in the early Universe, an additional channel of energy transmission was the energy of descending vibrations, as a mechanism for the creation of Worlds, while for a more mature Universe, a different method of vibrations was provided, ascending vibrations of evolutionary development [18].

10. Main Conclusions and Results

It is shown that before BB, there existed a primary space O_{SP} the carrier of which is a Primary Parent Particle $O_{\{N,A,P\}}\big|_{BR}$ consisting of Borromeo rings: O_N, O_A and O_P, representing neutral, active and passive Beginnings.

O_{SP} space is a space of states of two phases: the "sea of the Absolute" and multiple phases of "voids" interspersed inside the main phase.

The particles inside the "sea of the Absolute" retain integrity and unity, but outside of it, they disintegrate through 7 different channels, forming up to BB 6 particles $\{O_N, O_A, O_P, S_N, S_A, S_P\}$ —the initial building material of future universes.

It is shown, that six particles formed before BB induces new interactions described by the U_{ij} matrix, which leads us to the existence of 21 particles and their carriers.

These particles establish a hierarchy of worlds:

1) $O_{\{N,A,P\}}\big|_{BR}$ —1 Primary Parent Particle, the carrier of Primary space before BB;

2) O_N, O_A, O_P —3 particles, carriers of the cosmic genetic code;

3) $\{"0"_0,\ "0"_+,\ "0"_-,\ S_0,\ S_+,\ S_-\}$—6 particles, make up worlds of "clumps";

4) 12 particles, carriers of paired interactions, define the worlds inside the "clumps". Each "clot" The force ("−", 2) contained information about how to fill cosmic matter with a mind, a conscious principle. It is important to note that each of the 3 forces in the "seeds of Creation" possessed not only its own, originally set, natural properties, but also two others acquired as a result of the action of the "triad democracy".

The fundamental interactions described by the matrix U_{ij}, assume the existence of vortex fields before BB described by the antisymmetric part of the matrix $U_{ij} \to \tilde{A}_{ij} = \frac{1}{2}\left(U_{ij} - U_{ji}\right)$. The importance of this conclusion is that rotating universes can form.

From averaging Einstein's equations, new cosmological solutions of scale factors for "clumps" with an inhomogeneous distribution of matter are obtained.

The structure of the triads forming the triad core in the center of the "clots" is investigated and the trigger mechanism of the explosion of the triad core is con-

sidered.

Expressions of the BB energy, numerical estimates of the number of galaxies and stars in the Universe, the masses of the triad nucleus and the Universe are obtained.

The concept of the cosmic genetic code is formulated. Its structure, functions and role in the birth and formation of the structures of the Cosmos are considered.

We want to point out, that physics beyond the Big Bang is one of the challenges to modern physics and in the present time is intensively developed in a number of works. One of the most promising directions is connected with quantum loop gravity (see for example [19] and references in it). However, the question of the nature of the Big Bang and everything that came before it still does not have its final solution, due to the fact that the quantum theory of gravity has not yet been built. There are different approaches to its solution, but all of them are still under development. Therefore, we believe that an approach based on the formation of general principles and obtaining conclusions based on them that can help in constructing the final theory of quantum gravity can be very useful. We went this way.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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