

## Hypotheses

### **BASIC COSMOLOGICAL CYCLE OF THE UNIVERSE**

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#### **Abstract**

*In the report it is presented the idea of the transformation of the fundamental physical Essence, with exactly definite parameters, in the matter and reverse.*

The contemporary science determines the average density of the substance in the observed part of our Universe to a value between  $10^{-29}$  -  $10^{-30}$  g/cm<sup>3</sup> [1-3], and specifies as a "critical" the value of  $10^{-28}$  g/cm<sup>3</sup>. On the other hand, according to a new hypothesis, in [4] it has been presented the idea about the absence of vacuum and the gravity, and the bodies' attraction is explained, through pushing the bodies to one another as a result of the pressure exerted by a real physical Essence, filling the cosmological space. It is shown that namely this particular physical Essence, of specified physical parameters, is at the foundation, the prime cause and the source of all structures and processes in the Universe, is a prerequisite and determines them. One of the fundamental parameters of this Essence, namely the density, has been determined to the value of  $1,5 \cdot 10^7$  g/cm<sup>3</sup>. In (4) it is also scientifically substantiated, that the substance and as a result all physical bodies are originated and structured from and under the impact of this fundamental Essence by "condensing" of the masses from the Essence into masses of the substance, from the known particles to the giant physical structures, planets, suns, galaxies. Namely, the substance's structural particles do not differ from the compacted Essence, but of a significantly greater density compared to that of the Essence, and as a result obtaining new physical properties.

The proportion between the two specified values of the density is of the order of  $10^{37}$  or the average density of the substance in the Universe space is  $10^{37}$  times less than the density of the Essence. Just so times, according to science, is less effective the alleged gravitational interaction compared to the electromagnetic. Is this an accidental coincidence or it is a deeply premised regularity?

If a value of the order of  $10^{37}$  presents actually some fundamental proportion and the “critical“ or the marginal average density of the substance in the Universe, which has been determined by the contemporary science to a value of  $10^{-28}$  g/cm<sup>3</sup>, then the following processes' chain emerges as the most probable. From the hypothesis, presented and justified in [4] follows, that the density of the Essence and the average density of the originated substance from it, are in inverse proportional dependence i.e. the more dense is the Essence, the less is the average density of the substance and vice versa, because they are to each other a function and a consequence. This dependency and the known values for both parameters allow them to be in the first approximate analytically estimated the possible range of variation or dispersion of their values and their ratio in the process of the Universe evolution, as shown in the following table:

<b>The Essence density, <math>\rho_E</math> [g/cm<sup>3</sup>]</b>	<b>The substance average density, <math>\rho_M</math> [g/cm<sup>3</sup>]</b>	<b>The densities ratio</b>
$10^8$	$10^{-31}$	$10^{39}$
$1,5 \cdot 10^7$	$\sim 10^{-30}$	$\sim 10^{37}$
$10^6$	$10^{-29}$	$10^{35}$
$10^5$	$10^{-28}$	$10^{33}$

The data at the second row refer to the values of the corresponding density and their ratio to the current period of the Universe evolution.

What hints are obtained from the table data? As far as the Essence is obviously fundamental, and the matter in all its forms of substance and radiation, a consequence and a product of the evolution of its parameters, there is a reason for admission the following chain of processes. Let assume as initial the one of the two marginal conditions, according to the table, for example the top one, at the Essence density of  $10^8$  g/cm<sup>3</sup> and the average density of the substance of  $10^{-31}$  g/cm<sup>3</sup>, then in this condition there is almost no substance. Whole energy, correspondingly the mass of the substance, through radiation has gone into the Essence, and its density has reached the specified value. It is probably a marginal or “critical” density of the Essence, and if so, then in this state the Essence should experience a need of a phase transition in order to “rid” of this critical density and to reduce it. Most likely the Essence gets out from this state “explosively” and passes to another.

According to the theory of "Hot big bang" this is the beginning and the birth of the Universe and the point of singularity, i.e. of invalidity of the known laws of physics. In accordance with the hypothesis of [4] this is not a point of singularity, but it is equivalent to all other points and periods in the evolution of the fundamental Essence and the substance, with specific values of physical parameters, when through a jump or by a slower process from the Essence primary formations “condense” or the known elementary particles, having a density in the range of  $10^{13}$  -  $10^{14}$  g/cm<sup>3</sup>, i.e. significantly higher than that of the Essence, from which they originate.

It should be noted that in such an approach and explanation of the origin and the structuring of elementary particles, there is no question about what gives them mass. As well as the searching for the alleged X-boson, which the modern science insistently looks for as a reason and beginning of their genesis. Is not it logical the idea that no one gives a mass of particles, they just retrieve it from the Essence by condensing and concentrating thereof and in its environment? More likely X-boson as physical attributes and parameters could be a long gone phase at the structuring of the elementary particles, could be a form of the early stages of their formation, intermediate unit between the Essence and the substance in its next phase of evolution and now its search and finding is meaningless. Figuratively speaking, this event or process can be considered like a start and emergence of the known matter or substance, conditionally named "bright" matter in which, naturally, the density of the Essence or conditionally again "dark" matter has fallen to a value of  $10^5 \text{ g/cm}^3$  and the average density of the substance occurs increased and accepted the value of  $10^{-28} \text{ g/cm}^3$ . This particular value the contemporary science considered "critical", without a clear reason for this. Because it is difficult to find an obvious and convincing reason of transferring the majority of the Essence into substance, but becomes exactly and only that. Therefore, it is more objective, the Essence value of  $10^8 \text{ g/cm}^3$  to be considered as a 'critical', since at this value there is a need for a phase transition and change the values of the density and also switching to another extreme state, corresponding to the bottom row in the table.

What should be the chain farther? Natural process, based on experience and knowledge of physics, chemistry, astronomy and other sciences, hereinafter the new final state must follow the evolution towards baseline condition. Reducing the average density of the substance due to radiation of energy, respectively mass, and the overflow back to the primary Essence resulting in increased density of Essence again to reach the marked above marginal or "critical" value.

This sequence is a possible chain in the main eternal and unending circle in the Universe, cycle of transformation of Essence into matter and vice versa.

What consequences can have the alleged circle or the cosmological cycle?

The last column of the table indicates that the ratio of the densities of the essence and the average density of the substance also vary within certain limits, i.e. the state of the Essence and the substance, albeit very slowly with respect to the time scale, change within specified limits. Since the density of the Essence and the substance is variable in time, then it seems logically another parameters and also the parameters of the processes developing in them must be as well as of variable values. For example, the speed of electromagnetic oscillations, which are the product of the Essence and the substance should be a variable, i.e., not a constant. The speed of electromagnetic oscillations can be regarded as constant only in a very large time scale.

Of interest is the question concerning duration of this universal cycle. On

the base of the ratios and proportions in the table and the known age of the Universe, according to the science is of the order of 13-15 (13.7) billion years, it may be concluded, that the current stage of the Universe evolution is somewhere around the late third and the beginning of the final quarter of the cycle. Therefore, the total duration of the alleged cosmic cycle must be of the order of 17-20 billion years. On the other hand, according to the theoretical justifications and calculations, relating to the on the duration and the balance of the two main types of reactions in suns, shown in one of the fundamental works of the famous astrophysicist Schwarzschild [5], the residual resource of the suns and the solar systems from their main continuity to the attenuation, fading and the energy respectively the mass releasing into the Essence, could be determined to a value of the order of 50-60 billion years. Namely, the duration of the cosmological cycle is going to be of the order of 70-80 billion years.

As can be seen, the difference in the two estimates made by two independent approaches is essential, which requires serious research to establish a more reliable value for the duration of the basic universal cycle. One of the emerging opportunities in this regard is the detection and identification of the cause or factor determining accelerated, inflation transition from substance to Essence, which could bring the two values to acceptable differences. Another option is to precise and clarify the current age of our Universe. Which of the two options is more worthwhile in trying to establish with greater precision the length of the universal cycle is a matter of further research.

Finally, it should again be paid attention to relationship  $10^{37}$ , since it was set and used as a defining in the analyses, calculations and conclusions in the report. Already specified, that besides the ratio between the densities of the Essence and the substance, it also expresses the proportion of the forces or the intensity of the gravitational and the electromagnetic interactions. In [4] is justified and shown that gravity and gravitational interactions respectively and waves are not real physical phenomena or processes and their effect is due to the pressure of the physical Essence on the material bodies formed from it in its environment. So that the ratio of  $10^{37}$  should reflect the proportions and dimensions, responsible and consistent with the mutual influence of the Essence and substance in the process of their transformation and evolution, including electromagnetic interactions, which is their product.

As a result of the implemented studies, presented in the report, are created prerequisites for clarification of a number of not yet sufficiently well understood by the modern science questions about the structure and the processes developing in the world around us. Summarized and briefly expressed, the new information consists in the fact that all structures and processes in the Universe arise from real physical Essence, with certain physical parameters and develop cyclically in unending cycle.

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## ОСНОВЕН ВСЕМИРЕН КРЪГОВРАТ

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### Резюме

Докладът представя идея за кръговрат на преобразуване на основополагаща физическа същност, използваща всемирното пространство, във вещество и обратно. Определени са вероятните числени стойности на плътността на същността и средната плътност на веществото във Всемира при това преобразуване, границите на тяхната промяна и съотношението им. На тази база е показано, че за „критична” би следвало да се приема не сега приетата средна плътност на веществото  $10^{-28} \text{ g/cm}^3$  във всемирното пространство, а нова стойност, характерна за плътността на основополагащата същност. Предложени са също така два подхода за определяне на периодичността на предполагаемия всемирен кръговрат.