

Age of the Universe

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In the present paper the materialistic model of the Universe (YRA-model) is presented and the formula of age of the Universe is resulted.

According to the author, the Universe has a center. Center of the Universe is a Singularity. The Singularity in its composition contains a finite amount of matter (pra-matter), which is determined by the unique constant of the nature (UCN). Matter in the nature is represented and taken into account in the form of natural units of the matter (NUM). Natural unit of the matter (NUM) is also a natural unique unit of the measurement (natural measure), a unique measure of all things and all phenomena in the nature. Before the beginning of the evolution of the Universe, all matter was in the Singularity. Total quantity of the matter in the Universe is finite and equal to the value $UCN \cdot NUM$. Total quantity of the matter remains invariable during all time of evolution of the Universe. It's the law of nature. The Singularity is the natural material quantum harmonic oscillator. The Singularity is also an emitter of the matter. The Singularity emits the matter into the Universe. Its operating frequency determines the rhythm of the nature. In each elementary step of rhythm of the nature (ESN) the Singularity generates and emits one matter's particle, which we call an atom of the matter. Thus the Singularity also is the unique generator of atoms of the matter in the nature for our Universe. Each atom of the matter contains the same constant amount of matter equal to value of $UCN^{-1} \cdot NUM$. This is the minimum amount of matter in nature. It's the law of nature. Of one natural unit of matter (NUM) it is formed UCN atoms of the matter. The elementary step of the rhythm of the nature corresponds to the elementary unity of the nature universal time. This is the dimensionless time. The duration of time is determined in a natural way through the matter. Namely, an elementary unit of time's duration (EUT) corresponds to the elementary step of the rhythm of the nature. It also corresponds to an atom of matter and to the amount of matter that is contained in each atom of the matter. It will be dimensional time. Its dimension will coincide with dimension of a matter. The larger unit of time's duration (NUT) consists of UCN units of EUT: $NUT \equiv UCN \cdot EUT$. It is clear that there is a one-to-one correspondence between the dimensional time and the matter. This can be expressed as a formula **time \equiv matter** or

NUT≡NUM. It's the law of nature. Age of the Universe can be defined in the steps of the rhythm of the nature as the dimensionless time. There is an elementary step of the rhythm of the nature (ESN), and there is a larger unity. This is a natural step of the rhythm of the nature (NSN). Takes place the following equality: $NSN \equiv UCN \cdot ESN$. The age of the Universe is connected directly to the gravitational constant. Age (A) of the universe in units of NSN is given by formula:

$$A \equiv \{G\}^{-2} \equiv 1/\{G\}^2, \quad (1)$$

here G is Newtonian constant of gravitation: $G = 6.67384 \cdot 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$. In the seconds the age (A) of the Universe is determined by the formula:

$$A \equiv \alpha \cdot \{G\}^{-2} \equiv \alpha/\{G\}^2, \quad (2)$$

here α is fine structure constant: $\alpha = 7.29735 \cdot 10^{-3}$. Physical quantity, enclosed in braces, expresses the numerical value of this quantity. If in the right parts of these formulas to substitute numerical values of entering physical quantities for a modern epoch of the Universe ($G = 6.67384 \cdot 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$), we obtain the value of up-to-date age of the Universe. In the units of NSN, it will be equal to value $A = 2.24517 \cdot 10^{20}$. In seconds, it will be equal to value $A = 1.63838 \cdot 10^{18} \text{ s}$. In the years it will be equal to value $A = 51.917 \cdot 10^9$ years. From formula (1) it follows $\{G\} \equiv A^{-0.5} \equiv 1/\sqrt{A}$, here A is age of the Universe in units of NSN. This means that the physical quantity of Newtonian constant of gravitation is not constant. As, the quantity of the matter in the Singularity is terminating quantity time of evolution of the Universe is restricted. The Universe had the beginning, and the Universe will have the finish. Blanket time of evolution of the Universe will make $UCN \cdot NUT$ or $2.799 \cdot 10^{34}$ years. The author has established that $UCN \equiv \{c^4 \cdot G^{-1}\} = 1.21034 \cdot 10^{44}$. As the Universe has the beginning, both the age of the Universe and the natural universal time are the absolute physical quantities. The author expresses gratitude to grandson Maksim for joint walks on the nature. During these walks materiality of the nature and life was felt especially obviously.