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NEWS

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OF THE REPUBLIC OF KAZAKHSTAN

**ФИЗИКА-МАТЕМАТИКА
СЕРИЯСЫ**



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**SOLUTION OF THE COSMOLOGICAL PROBLEM
IN THE APPROXIMATIONS. (PART-2)**

Abstract. To determine the state of the Universe at any pre-specified time it is possible only to a cyclic model in which the entropy of a cycle is equal to zero, and the mechanism of evolution works exactly obeying the principles of Kant-Laplace determinism. The loop with extremely high probability can be established by boundaries quantitative applications of General relativity. As this area manifests itself for a huge period of time, it is impossible to determine it empirically. The article suggests the mediate path based on the determination of the structural transformations limits of dynamic variant of Minkowski geometry, which group of transformations is invariant. Taken as a basis instead of the Riemann geometry, it is possible to carry out the solution of the cosmological problem in six approximations with the definition of the most important quantitative indicators of the Universe evolution.

Key words: cosmological problem, the scope of the general theory of relativity, n-dimensional version of the Minkowski geometry, cyclic model of the evolution of the Universe, the range of values of variables, speed of light, evolution of the periodic table of chemical elements, metaperiod "arrow of time" cycle of the Universe, Absolute Universe, the physical nature phenomena of life and intelligence.

... IN THE THIRD APPROXIMATION

Only singular state of matter (electromagnetic and neutron) and the areas located near them, do not represent the nuclear state of matter. All other evolution stages of the Universe are represented by the atomic structure of matter. It determines the next most important aspect of the cosmological problems concerning the evolution of the chemical elements, because this process comprises the organic unity of the evolution process of the Universe.

Currently, there is a tendency among scholars to consider the periodic law and the DI Mendeleev periodic system of chemical elements justified by only quantum mechanical theory of atomic structure. It explained the cause of the periodicity in the structure of atoms and elements and found space correlation of element, group and period of quantum numbers. But this theory did not find a correlation to the largest structural unit of the periodic system - dyads established by Rydberg in the early 20th century, [14] [Rydberg 1914: 145]. Probably, such a justification of dyad to be expected on the part of the evolutionary theory of the periodic system, not yet created, but intuitively formulated at the end of the XIX century as the doctrine of inorganic Darwinism [10] [Cedars 1976: 52-56].

In the second half of the XX century, there was a question about the upper boundary of the periodic system, which undoubtedly is also a matter of the evolution of the chemical elements. The method of Mendeleev "atom-analogy" makes it impossible to predict its upper border. The forecast is carried out based on the phenomenon of radioactivity and hypothetical nuclear shell model, as well as stemming from it "magic numbers" of nucleons. Blur periodicity in heavy atoms, allegedly shows the exhaustion of the total volume of the system in the area of the second hundred of the chemical elements.

The quantum-mechanical theory, in Bohr's testimony [3] [Bohr 1970: 291] and Sommerfeld [9] [Sommerfeld 1956: 134], was based on the chemical systematics and spectroscopic data material. Of them spectroscopic data was only subjected to statistical processing, as chemical systematics of the periodic

system had already contained the results of the previous statistics (time, group and element place). In the quantum model of the atom, they found the exact deflection in quantum numbers.

Obviously, the new theory of the periodic system should be built if there is solution of another fundamental problem and not described atomic theory of the structural units of the system. System has both of them as an evolutionary problem and the biggest structural unit, not an explanation. Let us clarify this.

If a number of periods: 1 2 3 4 5 6 7 is connected to electronic

2 8 8 18 18 32 32

filling of the atomic shells, then a number of dyads:

1 11 111 1Y

4 16 36 64

is not connected to any quantum-mechanical information.

It is natural to assume that together with a number of elements varieties of periods and of dyads constitute three levels of organization of the periodicity of chemical elements:

1) dependence of the properties of elements of atomic number (Z),

2) dependence of the periods power on period atomic number (n)

3) dependence of the dyad power on the atomic number of dyad (Q).

This makes it possible to use the method of statistical processing of the periodic system data in relation to the three levels of the periodicity organization.

It should be noted that consideration of the periodicity is still limited to only the first level, for which, unlike the other two, it is known a lot of numbers (figure 7). Such a different representation of these levels requires to take as a basis of method the research of the second and third levels of the periodicity organization receiving for them the same set as for the first level [6] [Drozdov 2012: 5].

By summing the values of certain chemical elements within the periods we get a series of numbers that characterize the power of periods - number of periods. Set of period numbers is due to a variety of used element parameters. Charts of these varieties suggest that in many cases there is no monotony of period power with an increase in its number (figure 8). Based on this and using the elements of the mathematical method of parabolic interpolation [4] [Bronstein 1965: 70], for the number of dyads we use not only the addition of the received power, but also subtracting the smaller from the larger numbers of periods within the dyad. Charts of dyads numbers are presented in figures 9, 10.

Statistical comparison of graphs of numbers of the three levels of periodicity organization indicates that a gradual transition from the first to the third level tends to mathematical simplification. If the first level graphics have a large number of breaks, and the graphics of the second level - fewer breaks, the third level graphics in general are expressed in a smooth curve in the form of a parabola. Only a few dyads numbers falls out of the picture, which can be explained either by an exception to the general rule, or submission to other functional relationship shown in figure 10 by reciprocating wave.

Preferableness of the second assumption can be justified as follows. If the first level of the periodicity organization made it possible to distinguish the period, and the second level - the larger structure - the dyad, the third level being equal to the first two, is to carry information about the new larger structural unit of the periodic system.

Thanks to their periodic properties the new structural unit of the system can be called meta-period. Evaluation of meta-period power, calculated according to the formula for a period of dyad $N = 2Q^2$, gives a value of 362 elements. Of these, 86 occurred in the first half-wave related to the phase of expansion of the Universe, and the rest - in the second half-wave related to the compression phase. This separation of some chemical elements in parts of meta-period coincides with the boundary of stability of elements. Indeed, the elements are stable from the beginning of the periodic system until the end of the sixth period that leaves no hope for the possibility of the existence of "islands of stability in a sea of instability" in G. Seaborg's words.

From the set out point of view, dyad - a certain stage (one-seventh part of it) in the implementation of the meta-period. Of these, six major periods of the cycle of one of the worlds of the Universe responds six dyads of meta-period represented by the atomic structure of matter. The meta-period serves as the largest structure of the periodic system because of the lack of information on chemical elements of the second, third and so on cycles of the Universe.

Clearly, the evolution of the periodic system of chemical elements acts as a special case of the evolution of the Universe, which allows to formulate *the law of evolution of the periodic system* in the following way: *the dyads number of meta-period is uniquely determined by the number of periods of the evolution cycle of one of the worlds of the Universe.*

Modern views on the upper boundary of the periodic system is extremely contradictory. According to one point of view, based on the structure of the nucleus, the volume of the system is limited to the second hundred. Opposite point of view (expressed by Goldanski), resulting from the postulates of quantum mechanics on the significance of the principal quantum number, admits a potential infinity of the system, just a few billion elements [10]. Developing by ourselves views about the oscillatory nature of evolution of the periodic system allow to find *dialectical (dialectic-physico-chemical) solution of these contradictions: an infinite number of elements in evolutionary terms is realized through the final series, described by meta-period.*

Thus, we obtain a *solution of cosmological problems in the third approximation.*

... IN THE FORTH APPROXIMATION

Calculated amount (362) of chemical elements of the completed periodic system is very strictly meets its long-period form including the s-, p-, d-, f-, g-, h- elements. This form of the system is shown in figure 11. Conducted research [8] [Drozdov 2014: 4] showed that the author's form of the system makes it possible to forecast the physical properties of the elements of compression phase of the Universe. At first, prediction can confine the physical properties of the four main groups of elements: alkaline, earth metals, halogen and inert gases.

For this we use a method based on the known (logarithmic form) depending of the physical quantity on the other serving as an argument, in this case, the logarithm of the principal quantum number or numbers of the system period. Obtained in this graphic linear dependences can be extrapolated to the region 7-11 of periods of the compression phase of the Universe.

Composed graphic dependences are characterized by high rates of approximation. They allowed to carry out the forecast for the atomic masses, radii of atoms and ionization potentials for the four groups of elements of the compression phase of the Universe. However, in order to save space in the article one graph is given as an example (Fig. 12). It corresponds to the approximation factor of 0.994.

The quantitative results of the executed forecast are summarized in Tables 3-4. The necessary reference values are taken from the reference data [11] [Komova 1964: 172]. The values of obtained physical properties show the growth of metal and weakening metalloid properties, which may indicate the high reactivity of the elements of the compression phase of the Universe.

Thus, it was given a *fourth* (at the level of the substance) *approximation of the regarded problem of the evolution of the Universe.*

... IN THE FIFTH APPROXIMATION

Among many cosmological ideas of the XX century, such one was expressed according to which in the cyclic Universe model it is implemented only one "arrow of time" - entropy. In this model of the Universe cyclicality is artificial, since the movement of the Universe is put only one initial (?) yield - "Zero - time point", while the cyclic movement is possible only within the two limits. And each of them has to be a special qualitative state of matter. In the absence of the second limit backward movement (contraction) cannot be justified by the presence of only gravitational forces in the observable model of an expanding universe. On the expansion of the limit the system should enter into a state of maximum entropy, above which the entropy cannot be a factor in the spontaneous course of the process. In the phase of compression spontaneous movement should be determined not only by a factor of energy (gravity), but also ordering factor - the desire of system for maximum negentropy. Gravity as a weak force cannot in itself ensure the reversibility of time.

Striving for maximum negentropy will call into existence a new longer negentropic "arrow of time". If in the phase of the expansion the factor of gravitation (attraction) resisted the action of acceleration factors (kinetic energy and entropy), then in the compression phase gravity and negentropy act as factors of accelerated motion.

The representation of the "arrow of time" is closely related to the notions of physics and the phenomenon of life. The first concept ("arrow of time") combines the other two (the physics of the phenomenon of life). Moreover, if in the cyclic Universe only one "arrow of time" is implemented, this means that in nature there is only one orientation of events, only one physics. This version claims the absolute monopoly of the second law of thermodynamics in natural processes and makes it impossible to develop the natural scientific essence of life. Living organisms, not only not based on the increase in entropy, but are in relentless struggle with it in the ontogeny and phylogeny in the face of the one physics proclaimed the monopoly of the increasing process of entropy, and perform as miraculous phenomenon, random and not space.

However, in modern thermodynamics, there is no monopoly on the process of increasing entropy. The second law of thermodynamics admits along with the dominant orientation of events and also the opposite direction - decrease in entropy, although the likelihood of it is negligible. This means that the phenomenon of life has even a negligible, but quite natural scientific foundation. In order the phenomenon of life to acquire a truly cosmic sound it is necessary to recognize the second law of thermodynamics as symmetrical - in the scope of the universal cycle. In the expansion phase we will have to recognize entropic orientation of the physical events as dominant, entropic "arrow of time" and entropic physics, and in the compression phase - negentropic "arrow of time" and the same physics.

From the point of view of the symmetry of the 2nd law of thermodynamics, the phenomenon of life is a vivid manifestation in the environment of the dominant physical process of its opposite, which is dominant in the other phase of the cyclic Universe. In other words, *life in an expanding Universe reflects the orientation of events of physics of contracting Universe, and life in the contracting Universe reflects the focus of events of physics of entropy phase of the Universe.*

Thus, the solution of cosmological problem in the fifth approximation leads to the conclusion about the existence in the Universe of two physics and two biologies. Thus, the common opinion that thermodynamics cannot be used to explain as of the Universe and life phenomenon is unfounded, because it is not intended to describe a single object. Indeed, at infinite number of cycles in the absolute world it is infinite as the number of universes, and life phenomena, although in the half-cycle of the Universe life is a cosmic phenomenon in the singular in each of the worlds. The idea of two thermodynamic processes in the Universe cycle phases explains as a failure, haunting scientists in laboratory experiments on the creation of living organisms, and futile efforts to find extraterrestrial life and civilization. To turn inanimate matter into living organisms it is necessary a simultaneous birth of the whole living world. This will ensure the stability of the phenomenon of life against the destructive action of the dominant physical process by creating its own habitat. Our earthly Oasis and civilization are unique in one of the worlds of expansion phase of the Universe. Here we are alone! But it can be not only an occasion for grief. This idea gives to humanity the divine face. We stand on the threshold of the noosphere creation.

One of the immediate practical values of this research is the conclusion of senseless expenditure of funds and energy to the search for extraterrestrial life. Such seemingly pessimistic conclusion is obtained from *the fifth approximation of theorizes.*

IN THE SIXTH APPROXIMATION

Along with the phenomenon of life it is another important cosmological phenomenon - the mind. At first glance it seems that the mind is only the predicate of the phenomenon of life, and it is the only cosmic in the framework of the living. However, almost centenary development of cybernetics showed that the mind, unlike life phenomenon, can be simulated in the laboratory on inorganic matrix. This acquired independence of mind from the phenomenon of life underlines the status of the cosmological independence of mind in the Universe.

However, opponents may argue that cybernetics is able to simulate only the elements of the mind, not the mind as a whole, although the majority of specialists in cybernetics denies the existence of any analogy between human and artificial intelligence. Of those scientists who believe in the possibility of machine intelligence, it is possible to refer to N.N. Amosov [2], who believes that the machine will have artificial intelligence only when all the intellectual properties of a person will be recorded in its program.

Contrary to this statement the authors of this article believe that for artificial intelligence it is necessary to enter into the computer the additional program, modeling is only one important human

quality, in order the machine today to acquire the ability to reason and think [7 [Drozdov 2014: 4]]. In the author's model the human intellect is represented by two levels: the conscious and the subconscious. Consciousness is directly related to the will of the individual, and therefore inherent in all higher animals. It is switched off in sleep and when introduction of a tranquilizer to the organism. The most developed consciousness is represented in person in the form of imagination (inner peace), which is the basis of language, logic and thinking.

The subconscious - is folded process of will, which manages by automatic acts. Subconscious in developed form is manifested in the form of inner sense - intuition, which sometimes works even in the sleep state of consciousness. Both levels are equal and complementary to each other in an intellectual act, both are addressed to the same part of the brain - the cerebral cortex.

In terms of this concept, the computer does not have any analogue of consciousness or an analog of the subconscious, because deprived of free will and acts according to the will of the programmer and operator. Modern computer is a model of the "hypnotic sleep" of human, that is the subconscious, acting under the influence of the programmer and operator. The closest solution to artificial consciousness is robotics, modeling ability of the machine to the arbitrary actions. Message PC of free will is possible through the linking of arbitrary action with the task of the computer survival in the environment.

The problem of free will programming is solved by the extended Everett concept as a choice by subject of alternatives of behavior from all available in a superposition of only those that seem to it attractive (for example, those which are favorable for life) [M.V. Menski [12]]. The computer that runs on one of the well-known programs, is installed an additional program, which simulates the arbitrary actions that are closely linked with the survival capacity of the computer in the natural and social environment.

This all-round "care" of the computer about itself necessary for the freedom of the will, is the same as the third law of robotics by Isaac Asimov [1]. Computer awakening to the consciousness from "hypnotic sleep" should occur, first of all, in violation of the contact of the operator and the machine that will take some time for the initiation of awakened machine intelligence to the norms, comfortable for human (the period, like person education).

Statement of the possibility of the existence of the mind on the inorganic matrix regardless of the phenomenon of life gives it a universal status of autonomy (GOD status), which is the result of the cosmological problem solving in the sixth approximation.

Conclusions

1. Formulation of the cosmological problem restricts the choice of the Universe model of the cyclic variant with two outside movements and constant for all cycles the frequency and the length of the oscillation wave.

2. Range of motion of the Universe is defined by scope of general relativity, and the last - in quantitative terms - is determined by the interval of variable values of light speed.

3. A. Einstein adopted in science the idea of a variable speed of light in a variable gravity, but left uncertain the interval of variable speed of light values, and with it a quantitative expression of the field of application of general relativity.

4. If this interval of variable "c" values is implemented in the Universe during the process of its evolution, then to define it empirically is impossible, for which the indirect method is needed - theoretical, associated primarily with the formulation of a system of *axioms*.

5. In this paper we propose a method for determining the interval of speed of light variable values by examining the limits of changing the structure of the Minkowski geometry in its dynamic version, which puts the values of variables of speed of light from infinity to zero.

6. Thus, the transformation group of the Minkowski geometry becomes invariant with respect not only to the group of transformations of the classical theory of relativity, but also with the transformation group of general relativity, which allows to consider its dynamic version in general case, and the Galilean and Riemann geometries in particular cases, from the point of view of the correspondence principle.

7. To this end, a n-dimensional version of Minkowski geometry was carried out with definition in its structure area of two gravitating masses in the form of lenticular lenses; this geometry rendered interpretation of a snapshot of one of the stages of the Universe evolution.

8. The imposition on it the interval of variable speed of light values made it possible to obtain the geometric model of the Universe evolution in the volume of all stages of the cycle, to set a graph of the vibrational motion and to formulate the periodic law of the Universe evolution, which was the result of a decision of the cosmological problem in the first approximation.

9. On the basis of this Universe model it was obtained the solution of cosmological problems in the next five approximations to the calculation of variables values of speed of light, the speed of the relative motion of bodies of the world and anti-world, the age of all the stages of the Universe evolution, obtained new, the largest structure of the periodic system of chemical elements as the main indicator of its evolution, built long-period form of completed periodic system, a quantitative forecast of the physical properties of the Universe compression phase elements, given a physical justification of cosmology of life and mind.

10. Statement of the possibility of the existence of mineral-based mind with entropic "arrow of time" gives it the status of universal autonomy as the second, along with the phenomenon of life, negentropy phenomenon.

11. The solution of the cosmological problem has been obtained on the basis of the nomination of two new interrelated theories: the theory of Absolute world, as the highest branch of relativity, and the theory of evolution and the periodic system of chemical elements.

12. Further description of this model of the Universe represented by the particle (world and antiworld) and gravitational wave, should, in our view, and can be described in terms of wave-particle duality of De Broglie.

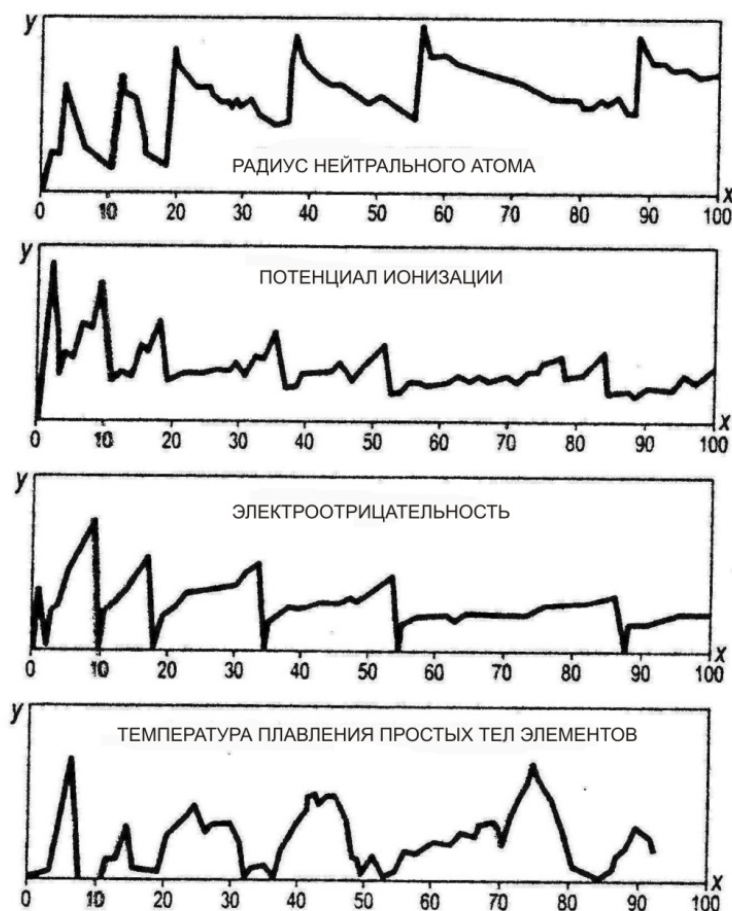


Figure 7 - Number of elements

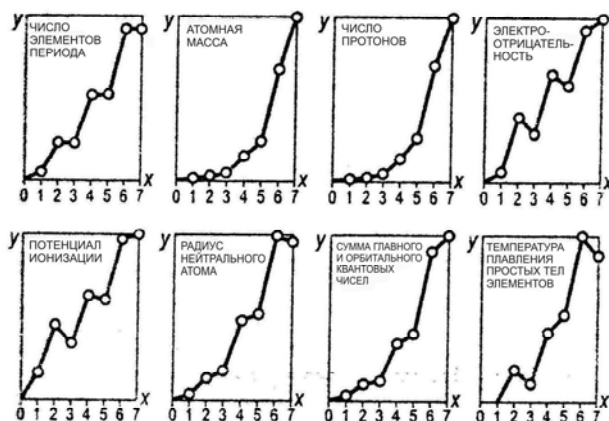


Figure 8 - Number of periods

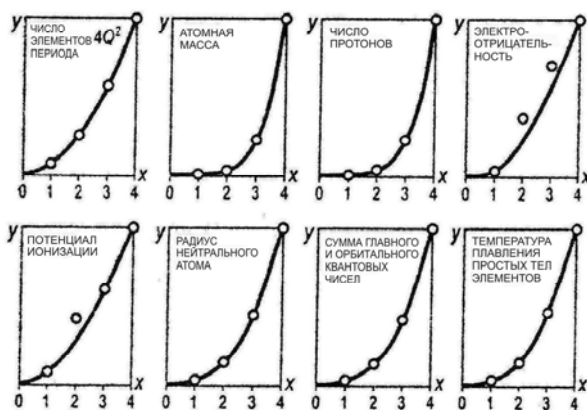


Figure 9 - Number of dyads obtained by summing the power of periods

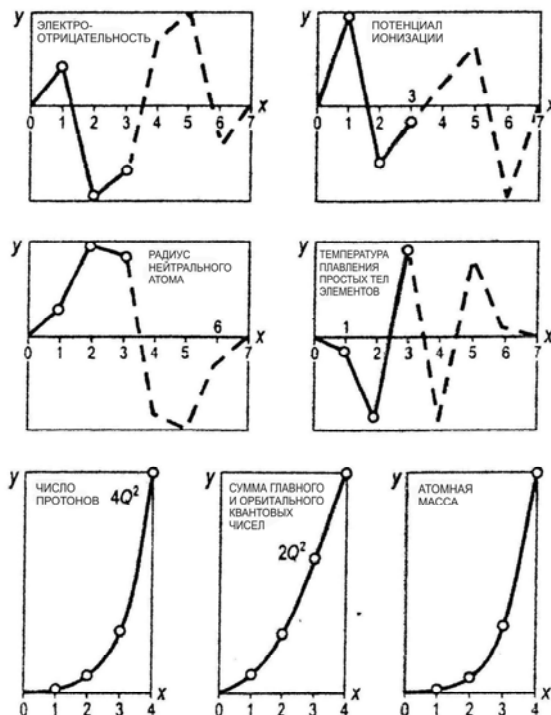


Figure 10 - Number of dyads received by subtracting power difference between the periods

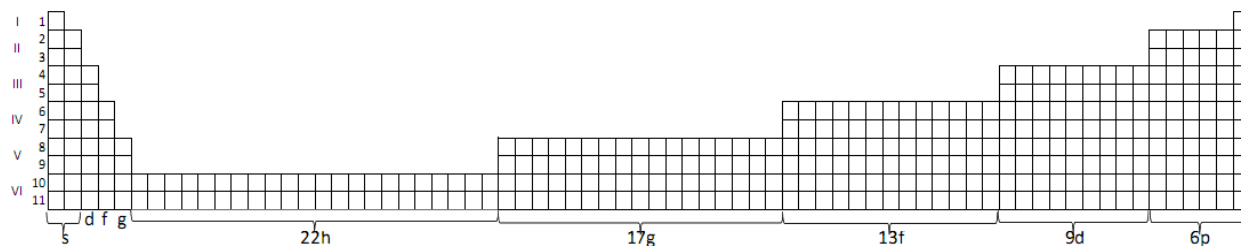


Figure 11 - Completed periodic system of elements in the amount of 362 (A.M. Drozdov)

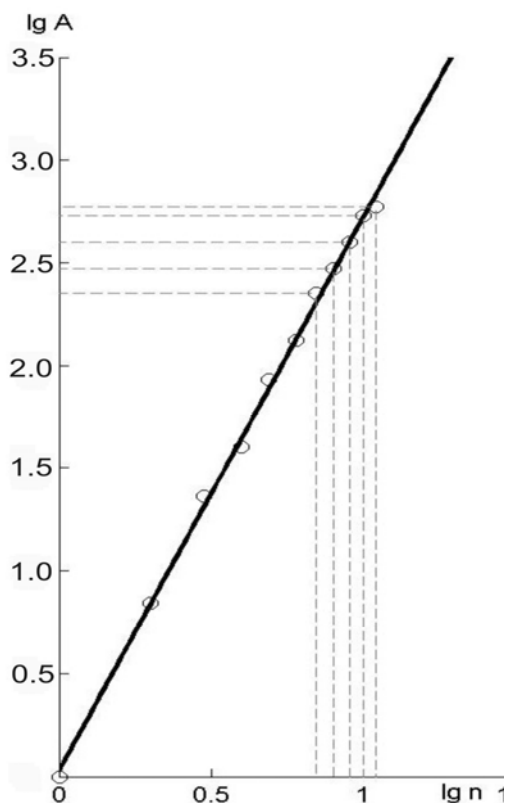


Figure 12 - Logarithmic graph of dependence of the atomic weight of the alkali metal on the atomic number of the period or of the principal quantum number (A.M. Drozdov, A. Yunusov)

Table 3 - The relative atomic mass of the elements from 1 to 11 period

№ of period n	lg n	Alkaline metals		Alkaline-earth metals		Gallogens		Inert gases	
		A	lg A	A	lg A	A	lg A	A	lg A
1	0	-	-	-	-	-	-	4	0.602
2	0.300	6.941	0.845	9.013	0.954	19.0	1.279	20.183	1.305
3	0.477	22.990	1.362	24.3	1.385	35.45	1.549	39.9	1.601
4	0.601	39.098	1.601	40.08	1.602	79.91	1.902	83.85	1.923
5	0.690	85.468	1.932	86.83	1.938	126.9	2.104	131.3	2.117
6	0.778	132.91	2.124	137.38	2.136	210.0	2.322	222.0	2.346
FORECAST OF ATOMIC MASS									
7	0.845	223	2.35	226.05	2.354	263	2.42	282	2.45
8	0.903	295	2.47	302	2.48	380	2.58	355	2.55
9	0.954	397	2.599	398	2.50	489	2.69	468	2.67
10	1.000	537	2.73	549	2.74	616	2.79	602	2.78
11	1.041	589	2.77	631	2.80	813	2.91	813	2.91

Table 4 - Forecast of radii of neutral atoms and ionization potential of elements

The principal quantum number of the number of periods	Alkaline metals		Alkaline-earth metals		Gallogens		Inert gases	
	R(A°)	μ (volt)	R(A°)	μ (volt)	R(A°)	μ (volt)	R(A°)	μ (volt)
1	-	13.5	-	-	-	-	1.22	24.5
2	1.56	5.4	1.11	9.3	0.64	18.60	1.6	21.5
3	1.92	5.1	1.6	7.6	0.99	13.0	1.91	15.7
4	2.38	4.3	1.97	6.1	1.14	11.8	2.01	13.9
5	2.51	4.2	2.15	5.7	1.33	10.4	2.20	12.1
6	2.51	4.2	2.15	5.2	1.58	9.30	2.34	10.7
Forecast of radii of neutral atoms and ionization potential of elements								
7	2.98	3.09	2.63	4.78	2.2	8.32	2.67	10.0
8	3.38	2.29	2.82	4.46	2.27	7.58	2.69	9.5
9	3.54	2.13	3.02	4.16	2.29	6.91	2.82	7.05
10	3.80	1.95	3.23	3.89	3.2	6.60	3.02	6.45
11	4.16	1.77	3.46	3.7	3.4	5.89	3.09	6.02

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КОСМОЛОГИЯЛЫҚ МӘСЕЛЕЛЕРДІ ШЕШУДІҢ ЖУЫҚТАУ САЛДАРЫ. (2-БӨЛІМ)

Аннотация: Бұл мақалада кез-келген алдын-ала берілген уақыт кезеңіндегі кеңістіктің қалпын анықтау тек қана циклдік моделдеу үшін ғана емес, аралық энтропия циклі нольге тең болған кезде, Кант-Лаплас детерменизм қағидасына сүйене отырып, эволюция механизмімен абсолютті тең жұмыс істейді. Сондықтан бұл уақыт аралығын неліктен өзін үлкен етіп көрсететіндігін анықтау мүмкін емес. Бұл осы авторлардың бірінің көтерген эволюциялық кеңістік құрылымы мен проблемаларының моделі туралы идеясы, бұрын біршама толықтырылып алынған. Риман геометриясын негізге ала отырып дайындалған бұл мақалада, космологиялық мәселелерді шешудің алты жуықтау салдарын пайдаланып әлем эволюциясының көрінісін анықтау.

Тірек сөздер: космологиялық мәселелер, қолданыс облысы ортақ салыстырмалы қағидалар, Минковский геометриясының n-өлшеуіш нұсқасы, әлемнің эволюциялық топтамасының моделі, жарық

қозғалысының айнымалы мағнасы, химиялық элементтер жүйесінің мерзімді эволюциясы, метапериод, «уақыт жүйріктігі» әлемінің топтамасы, абсолютті әлем, өмір мен ақылдың физикалық табиғатының феномені.

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РЕШЕНИЕ КОСМОЛОГИЧЕСКОЙ ПРОБЛЕМЫ В ПРИБЛИЖЕНИЯХ. (ЧАСТЬ-2)

Аннотация: Определить состояние Вселенной в любой наперед заданный момент времени можно лишь для ее циклической модели, в которой энтропия цикла равна нулю, а механизм эволюции работает абсолютно точно, подчиняясь принципам детерминизма Канта-Лапласа. Границы цикла с предельно высокой вероятностью могут быть установлены границами количественной области применения ОТО. Поскольку эта область проявляет себя за огромный отрезок времени, то определить ее опытным путем невозможно. В статье предложен опосредственный путь на основе определения пределов структурных превращений динамического варианта геометрии Минковского, группа преобразований которой выступает инвариантной группе преобразований ОТО. Взятая за основу вместо геометрии Римана, она позволила осуществить решение космологической проблемы в шести приближениях с определением важнейших количественных показателей эволюции Вселенной.

Ключевые слова: космологическая проблема, область применения общей теории относительности, п-мерный вариант геометрии Минковского, циклическая модель эволюции Вселенной, интервал переменных значений скорости света, эволюция периодической системы химических элементов, метапериод, «стрелы времени» цикла Вселенной, Абсолютный мир, физическая природа феноменов жизни и разума.

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