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ААЛАМДЫН АЛГАЧКЫ ЗАТЫ: КАРАҢГЫ ЗАТТЫН ЖАНА КАРАҢГЫ ЭНЕРГИЯНЫН СЫРЛАРЫН ЧЕЧҮҮ
ПЕРВОРОДНАЯ МАТЕРИЯ ВСЕЛЕННОЙ: РАЗГАДКА ТАЙН ТЕМНОЙ МАТЕРИИ И ТЕМНОЙ ЭНЕРГИИ
PRIMORDIAL MATTER OF THE UNIVERSE: SOLVING THE MYSTERIES OF DARK MATTER AND DARK ENERGY

Кыскача мүнөздөмө: Фридман теңдемесин талдоонун, космостук микротолкундуу фондук нурлануунун Планк картасынын маалыматтарын изилдөөнүн, белгилүү формулаларды трансформациялоонун жана логикалык талдоонун негизинде автор тарабынан «Туруктуу абал физикасы» деп аталган жаңы илимий концепция сунушталган. Космостук микротолкундуу фондук нурлануу Ааламдын калыптануусунун алгачкы этаптарында баштапкы материянын бирдей эмес бөлүштүрүлгөн болушу мүмкүн экендигин көрсөтөт. Автордун гипотезасына ылайык, бул баштапкы материя Аалам жаралган мезгилде өтө чоң көлөмдө болгон караңгы материя менен байланыштырылат. Антропикалык принциптин негизинде автор «Улуу реакция» түшүнүгүн сунуштап, анын жүрүшүндө караңгы материянын X-on кванттарынын басымдуу бөлүгү жарык кванттарына жана караңгы энергияга айланган деген божомолду келтирет. Сунушталган моделде караңгы энергия Ааламдын мейкиндиктик түзүлүшү менен байланышкан Z-on кванттары аркылуу түшүндүрүлөт. Ошондой эле Ааламдын кеңейүү кубулушун талдоонун негизинде анын формулалык модели чыгарууга аракет жасалган.

Аннотация: В статье на основе анализа уравнения Фридмана, данных карты космического микроволнового фонового излучения, полученных в рамках проекта Planck Collaboration, а также преобразования известных физических соотношений и логико-теоретического анализа предложена концепция, обозначенная автором как «Устойчивая физика». Рассматривается гипотеза о неравномерном распределении первичной материи на ранних этапах формирования Вселенной, связанной с темной материей. На основе антропного принципа автор вводит понятие «Великой Реакции», в ходе которой большая часть квантов X-on Темной Материи предположительно трансформировалась в кванты света и Темную Энергию. В предлагаемой модели Темная Энергия интерпретируется как система квантов Z-on, связанных со структурой пространственно-временной среды. На основе анализа процессов расширения Вселенной автором предпринята попытка вывести ее математическое описание и сформулировать соответствующую модель.

Abstract: Based on Friedmann's equation, the analysis of the Planck cosmic microwave background radiation map, transformations of known formulas, and logical reasoning, a new scientific paradigm has been formulated: "Sustainable Physics." The cosmic microwave background radiation indicates the non-uniform distribution of Primordial Matter at the birth of the Universe. This Primordial Matter is identified as Dark Matter, which existed in an extremely large quantity at the moment of the Universe's formation. As a result of the Anthropic Principle, a Great Reaction occurred, during which most of the X-on quanta of Dark Matter decayed into light quanta and Dark Energy. Dark Energy consists of Z-on quanta, which create the very fabric

of space in the Universe. The Formula of the Universe has been derived through the phenomenon of its expansion.

Негизги сөздөр: Фридман теңдемеси; CMB Планк; баштапкы зат; квант; караңгы зат; караңгы энергия; ааламдын формуласы.

Ключевые слова: уравнение Фридмана; КМБ Планка; первичная материя; квант; темная материя; темная энергия; формула Вселенной.

Keywords: Friedmann's equation; CMB Planck; primordial matter; quantum; dark matter; dark energy; formula of the Universe.

Introduction. It is well known that the continuous expansion of the Universe was first proven by Friedmann, who developed equations for General Relativity without imposing the condition of stationarity [1; 2]. It is important to emphasize that in Friedmann's equations, the expansion of the Universe began from a certain initial volume that contained Primordial Matter. To identify this fundamental Primordial Matter, we need to examine the modern Universe, which, according to data from the Planck space telescope, consists of ordinary matter (4.9 %), Dark Matter (26.8%) and Dark Energy (68.3%).

The concept of Dark Matter emerged between the 1930s and 1960s [3; 4], and approximately 70 years later, the phenomenon of Dark Energy was discovered [5; 6]. Many theories and hypotheses have been developed to explain Dark Matter and Dark Energy, yet none have provided a definitive and simple solution [7; 8]. It is important to highlight that all existing theories and hypotheses treat these mysteries separately, rather than considering them as interconnected. Notable research projects in this field include Lux, SuperCDMS, Xenon, Edelweiss, and Cosine-100 experiments [9; 14].

The quest to identify the elusive particles constituting dark matter has yielded limited success thus far. Consequently, certain scholars propose that either pre-existing assumptions regarding mysterious dark matter are flawed, or that dark matter may not exist at all [15; 16]. Analogously, skepticism surrounding the reality of dark energy is also evident [17; 18]. Nevertheless, the realms of cosmology and astrophysics offer multiple compelling indications of the existence of both dark matter and dark energy [19].

If the mysteries of Dark Matter and Dark Energy have remained unsolved for nearly a century, it may be useful to recall how physics overcame a similar impasse in the past. At the beginning of the 20th century, there were also three major unresolved problems in physics [20]: (i) the problem of black body radiation, (ii) the problem of the photoelectric effect, and (iii) the problem of atomic stability and size. These three challenges of classical physics were resolved only through the introduction of a new paradigm-Quantum Physics. Logically, this suggests that a new paradigm is needed to address the mysteries of Primordial Matter, Dark Matter, and Dark Energy.

Theoretical Results. Evidence for the origin of the Universe is also provided by the cosmic microwave background (CMB) radiation map, compiled from images taken by the Planck telescope. This radiation is a relic of the organized (Great) Reaction that led to the formation of the Universe, and it continues to propagate freely through space to this day, as shown in Figure 1 [21].

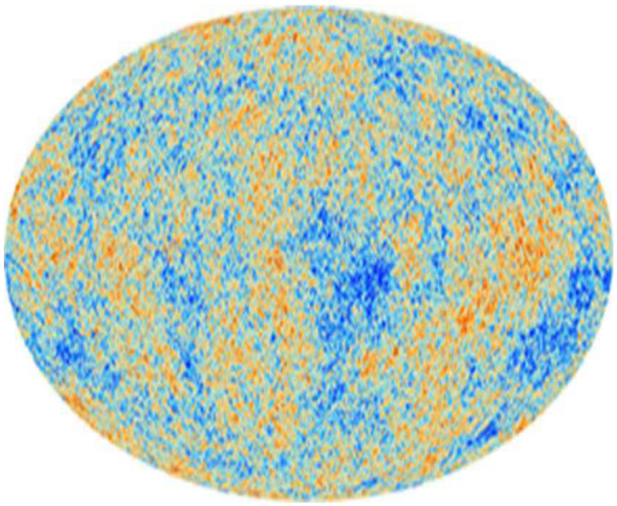


Figure 1. **Anisotropy of the cosmic microwave background radiation according to the Planck telescope. © ESA and the Planck Collaboration**

Each point on this Planck map corresponds to a massive cluster of galaxies. From this map, it follows that at the moment of the Universe's formation, an extremely large number of particles of Primordial Matter existed, each with a mass **m**. This raises a fundamental question: What exactly is Primordial Matter? How does it differ from ordinary (normal) matter and Dark Matter?

To solve the mystery of Primordial Matter, Dark Matter, and Dark Energy, we can utilize two fundamental approaches to scientific inquiry: Inductive method, and Deductive method.

Dark Matter is primarily found surrounding galaxies. But how many galaxies and stars exist in the Universe? The number is too vast to analyze using the inductive method. On the other hand, Dark Energy is associated with a single phenomenon-the expansion of the Universe. Which is easier to solve: billions/septillions of individual problems (inductive method) or a single problem (deductive method) to reach the correct conclusion? Naturally, it is easier to solve a single problem. Therefore, we should first consider the expansion of the Universe.

This expansion occurs at a velocity V (in absolute terms), which is directly proportional to the energy E required for the expansion of the Universe:

V = E (1)

where V is the velocity of expansion and E is the energy driving the expansion.

This proportionality can be transformed as follows:

$m = \frac{S}{tc^2}$ (2)

According to the Einstein's famous equation, mass m is expressed by the following formula:

$m = \frac{E}{c^2}$ (3)

From this, it follows that:

t E=S (4)

This relationship (4) between time, energy, and space was derived within the framework of classical physics. Now, let us examine this within the framework of quantum physics:

$E = hv$ (5)

A similar formula is then obtained:

h$^{\times}$E=S (6)

Discussion. Equation (6) expresses the relationship between quantum, energy, and space. But how should this very simple yet fundamental equation for the expansion of the Universe be interpreted? After all, it emerges precisely as a result of the phenomenon of the Universe's continuous expansion. Existing paradigms

in physics (classical and quantum physics) are unable to explain the physical essence of relationships (4) and (6).

To explain the relationship between quantum, energy, and space (6), we propose a new paradigm, which we call "Sustainable Physics." Thus, at the moment of singularity, the initial volume of the Universe consisted of an extremely large number of X-on particles (quantum of the Primordial Matter), which were structurally filling an initial sphere of a certain size. As a result of the Anthropic Principle, an organized Great Reaction of X-on particles was initiated, leading to the formation of: Light quanta (h) and A is new type of space quantum, which we call Z-on (6).

Thus, we can express Equation (6) in the following form:

A E = Z (7)

where A represents a quantum of Dark Matter, denoted as X-on, E is energy, and Z is a quantum of Dark Energy, denoted as Z-on.

Accordingly, we define this relationship (7) as the Formula of the Universe, which describes the state of the Universe from the moment of the Great Reaction to the present day.

The Anthropic Principle of the Great Reaction is also indicated by the cold spots on the cosmic microwave background radiation map [21]. On this map, according to data from the Planck space observatory, blue regions represent areas that are colder than the red regions. This fluctuation clearly demonstrates that the reaction of X-on particles first occurred in the blue regions, leading to the formation of an enormous number of galaxies.

Due to the "burning" of this immense amount of "fuel," an extremely large number of Z-on particles (Dark Energy) were produced. The Dark Energy particles form a metric substance mass, which constitutes what we perceive as space.

Thus, the Universe was born, and according to the Formula of the Universe (7), it continues to expand due to the continuous increase in the number of Z-on particles.

Experimental confirmation of the existence of Dark Energy comes not only from the continuous expansion of the Universe but also from the so-called "Boötes Void" and other "voids"-regions of space where no stars exist at all [22]. In these regions of the Universe, X-on particles have completely "burned out," leaving behind only Z-on particles-in other words, space itself. The next candidates for the formation of voids are galaxies that have almost no Dark Matter surrounding them [23].

The decrease in the proportion of Dark Matter in the modern Universe compared to the Universe shortly after the Great Reaction has been demonstrated in the DDM model (Decaying Dark Matter) [24]. Although the modeling in this study yields correct results, the authors misinterpret their findings, as they are unfamiliar with the new paradigm-Sustainable Physics. They assume that Dark Matter consists of multiple components and decays into neutrinos or hypothetical relativistic particles.

However, the actual decay process of Dark Matter is described in Equations (6) and (7), while the sizes of Dark Matter and Dark Energy quanta will be explored in a future publication.

Conclusion.

1. Friedmann’s equation and the anisotropy of the cosmic microwave background radiation observed by the Planck telescope are the key to understanding Primordial Matter, Dark Matter, and Dark Energy.
2. Primordial Matter (the initial matter of the Universe) is Dark Matter.
3. Dark Matter consists of X-on quanta, which existed in an extremely large quantity at the moment of singularity in a structured manner. Due to the Anthropic Principle, a deliberate and organized Great Reaction of X-on particles occurred, leading to the formation of Z-on particles (metric substance), thereby creating Space. These Z-on particles are Dark Energy, which constantly expands the Universe, meaning that space itself continuously increases.
4. The primary source of material ("fuel") for stars, from the Great Reaction to the present moment, is Dark Matter (X-on).

5. Dark Energy is the product of the "burning" of Dark Matter, meaning that stars are the source of Dark Energy.

6. The very fabric of space in the Universe is Dark Energy.

7. The operation (expansion) of the Universe is described by the Formula of the Universe, which has been discovered within the framework of the new paradigm-"Sustainable Physics".

References

1. Friedmann A. Über die Krümmung des Raumes // Zeitschrift für Physik. 1922. Vol. 10. P. 377–386.
2. Friedmann A.A. The World as Space and Time. Moscow: Nauka Publishing, 1965.
3. Zwicky F. Die Rotverschiebung von extragalaktischen Nebeln // Helvetica Physica Acta. 1933. Vol. 6. P. 110–127.
4. Vera Rubin Who Confirmed “Dark Matter” Dies // Carnegie Science. 2016. URL: https://carnegiescience.edu/news/vera-rubin-who-confirmed-dark-matter-dies (дата обращения: 23.05.2026).
5. Riess A.G. et al. Observational Evidence from Supernovae for an Accelerating Universe and a Cosmological Constant // The Astronomical Journal. 1998. Vol. 116. P. 1009–1038. URL: https://iopscience.iop.org/article/10.1086/300499
6. Perlmutter S. et al. Measurements of Omega and Lambda from 42 High-Redshift Supernovae // The Astrophysical Journal. 1999. Vol. 517. P. 565–586. URL: https://iopscience.iop.org/article/10.1086/307221
7. Straumann N. Dark Energy: Recent Advances and Open Questions // Modern Physics Letters A. 2006. Vol. 21. P. 1083–1100. URL: https://arxiv.org/abs/hep-ph/0604231
8. Teerikorpi P., Chernin A.D., Baryshev Yu.V. The Large-Scale Matter Distribution and the Cosmic Vacuum: Current Issues // Astronomy and Astrophysics. 2005. Vol. 440. P. 791–798. URL: https://ui.adsabs.harvard.edu/abs/2005A%26A...440..791T/abstract
9. SuperCDMS Super Cryogenic Dark Matter Search. URL: https://supercdms.slac.stanford.edu (дата обращения: 23.05.2026).
10. XENON Dark Matter Project. URL: http://www.xenon1t.org (дата обращения: 23.05.2026).
11. Edelweiss. Experiment for Direct Detection of WIMP Dark Matter. URL: http://edelweiss.in2p3.fr (дата обращения: 23.05.2026).
12. LUX Dark Matter Experiment. URL: https://lux.brown.edu (дата обращения: 23.05.2026).
13. Bernabei R. et al. Performances of the about 100 kg NaI(Tl) Set-up of the DAMA Experiment at Gran Sasso // Il Nuovo Cimento A. 1999. Vol. 112(6). P. 545–575.
14. COSINE-100 Dark Matter Experiment. URL: https://cosine.yale.edu/home (дата обращения: 23.05.2026).
15. Kang Y., Lee Y.-W., Kim Y.-L., Chung C., Ree C.H. Early-type Host Galaxies of Type Ia Supernovae. URL: https://arxiv.org/abs/1912.04903
16. Colin J., Mohayaee R., Rameez M., Sarkar S. Evidence for Anisotropy of Cosmic Acceleration // Astronomy & Astrophysics. 2019. Vol. 631.
17. Villata M. “Dark Energy” in the Local Void // Astrophysics and Space Science. DOI: 10.1007/s10509-012-0994-9. URL: https://arxiv.org/abs/1201.3810
18. New Evidence Shows that the Key Assumption Made in the Discovery of Dark Energy is in Error. URL: https://phys.org/news/2020-01-evidence-key-assumption-discovery-dark.html (дата обращения: 23.05.2026).
19. Cirelli M. Status of (Direct and) Indirect Dark Matter Searches. URL: https://pos.sissa.it/236/014/pdf
20. Quantum Physics. Berkeley Physics Course. Vol. 4. URL: https://archive.org/details/QuantumPhysicsBerkeley
21. Planck CMB Image // European Space Agency (ESA). URL: https://www.esa.int/ESA_Multimedia/Images/2013/03/Planck_CMB (дата обращения: 23.05.2026).

22. Kirshner R.P., Oemler A.J., Schechter P.L., Shectman S.A. A Million Cubic Megaparsec Void in Boötes // The Astrophysical Journal. 1981. Vol. 248. P. L57–L60. URL: https://ui.adsabs.harvard.edu/abs/1981ApJ...248L..57K/abstract
23. Researchers Find a Galaxy Without Dark Matter // Yale News. 2018. URL: https://news.yale.edu/2018/03/28/researchers-find-galaxy-without-dark-matter (дата обращения: 23.05.2026).
24. Chudaykin A., Gorbunov D., Tkachev I. Dark Matter Component Decaying After Recombination: Lensing Constraints with Planck Data // Physical Review D. 2016. Vol. 94. Article 023528. DOI: 10.1103/PhysRevD.94.023528.

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БИШКЕК ШААРЫНЫН АТМОСФЕРАСЫНА ПАРНИК ГАЗДАРЫНЫН ЖАНА АБАДАГЫ ЗЫЯНДУУ БӨЛҮКЧӨЛӨРҮНҮН ТААСИРИ
ВЛИЯНИЕ ПАРНИКОВЫХ ГАЗОВ И ВРЕДНЫХ ЧАСТИЦ В ВОЗДУХЕ НА АТМОСФЕРУ БИШКЕКА
THE IMPACT OF GREENHOUSE GASES AND HARMFUL PARTICLES IN THE AIR ON THE ATMOSPHERE OF BISHKEK

Кыскача мүнөздөмө: Илимий макалада 2022–2024-жылдардын күз мезгилинде Бишкек шаарынын жерге жакын аба катмарындагы парник газдарынын жана абанын курамындагы микроөлчөмдүү бөлүкчөлөрдүн концентрациясынын өзгөрмөлүүлүгү боюнча жеринен алынган маалыматтар берилди.

Аннотация: В научной статье представлены натурные данные об изменчивости концентрации парниковых газов и микрочастиц в приземном слое воздуха г. Бишкека в осенний период 2022–2024 гг.

Abstract: The scientific article presents field data on the variability of greenhouse gas and microparticle concentrations in the ground-level air layer of Bishkek during the autumn period of 2022–2024.

Негизги сөздөр: мониторинг; Бишкек; атмосфера; парник газдары; микроөлчөмдүү бөлүкчөлөр; смог; ультракызгылт көк нурлануу; климат; абанын булганышы.

Ключевые слова: мониторинг; Бишкек; атмосфера; парниковые газы; микрочастицы; смог; ультрафиолетовое излучение; климат; загрязнение воздуха.

Keywords: monitoring; Bishkek; atmosphere; greenhouse gases; microparticles; smog; ultraviolet radiation; climate; air pollution.