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Laws of Hierarchy and Dark Matter in The Universe

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Abstract

This article analyzes information regarding galaxy formation and the role of dark matter within them, as described in scientific literature based on the Standard Model of the Universe's origin. This information indicates that dark matter is not present in all galaxies and, furthermore, diminishes overtime. Conversely, it is demonstrated that the Standard Model - in its various modifications - contradicts the laws of physics and is therefore untenable. Moreover, the Standard Model overlooks the hierarchical structure of the Universe. In parallel, the article examines the Model of Universe Formation with Minimal Initial Entropy (UMIE), which is based on hierarchical principles and complies with all laws of physics. The UMIE model allows for a description of all universal processes without violating physical laws - specifically, the creation of matter without antimatter, the formation of all known chemical elements (including heavy ones), and the emergence of planets, stars, galaxies, and galaxy clusters. It is shown that the hierarchical structure of the Universe gives rise to seven physical interactions. Of these, the weak, strong, and electromagnetic interactions operate within three-dimensional space, whereas the four types of gravitational interactions are multidimensional. The multidimensional nature of gravitational interaction accounts for the low value of the interaction constant (γ, G), as the interaction occurs simultaneously across all layers of the stratified space of the Super-Universe. This facilitates the instantaneous transmission of gravitational interaction between stars, galaxies, and galaxy clusters. It is shown that the magnitude of the gravitational interaction constant within a galaxy significantly exceeds that within planetary systems, thereby ensuring the stability of the galactic structure. At higher hierarchical levels, the magnitude of the gravitational interaction constant is significantly lower than within planetary systems - a fact that may be perceived as the accelerated recession of galaxies. Dark matter, as currently sought in the Universe, lacks a hierarchical structure and therefore cannot exist.

Keywords: UMIE model, law of hierarchical systems, examples of hierarchical systems, 7 fundamental interactions in the Universe, 4 types of gravitational interactions, dark matter, and dark energy.

Introduction

During the development of the Standard Model of the Universe's creation, they did not consider the Universe's shape. They simply assumed it was the same as what we see in everyday life. Next, using information about galaxy clustering, they considered what would happen if they ran time backward. They began to compress the Universe and came to the conclusion that the volume of the Universe at its birth must be very small (singular point), the temperature of matter is very high ($T \sim 10^{28}$ K),[1] and the entropy will reach a significant level ($S_0 \sim 10^{88}$ J/K).[2] With such entropy, it is impossible to form planets, stars, galaxies, and clusters of galaxies.

Setting aside the various issues associated with the Standard Model, let us focus on the beginning as understood by the model's proponents. The scenario posits that the space containing all matter was compressed into a point or an infinitesimal volume. Nothing surrounded this infinitesimal volume. Yet, out of that absolute "Nothingness," the Big Bang emerged, giving rise to space, time, and our Universe! It is hard to conceive of greater nonsense. Given the Standard Model's existing criticisms, one cannot expect genuine progress in the physics of the Universe. Nevertheless, for decades, researchers have tried to refine this model without abandoning the singularity and its associated characteristics.

While staying within the Standard Model framework, experts have examined the Universe's possible shape. Modern space telescopes, such as WMAP and Planck, have demonstrated with high precision that our Universe is flat. This finding prompted a series of "improvements" to the Standard Model that do not, in fact, align with the laws of physics. However, theoretical studies show that a Universe could appear flat while actually having the topology of a 3-torus (see[3] and the references therein). Such a conclusion invalidates a number of these "improvements." In reality, it is necessary to discard the Standard Model - along with all its variations - and develop a new model of the Universe's origin that does not contradict the laws of physics. This is precisely the problem this article addresses.

The theory of dark matter and the results of astronomical research

A flat Universe structure requires the actual matter density to equal $\rho_{cr} = 10^{-29}$ g/cm³. However, astrophysicists have found that the Universe's actual matter density is only about 5% of the critical value derived from Hubble's law. Furthermore, studies of stellar motion within galaxies show that galaxies must have significantly more mass than is observed. Consequently, to "refine" the Standard Model, scientists introduced dark energy and dark matter, despite not understanding their true nature. This gave rise to the modern Standard Model of the Universe, known as ΛCDM.[4] Although the exact nature of dark matter and dark energy remains unknown, thousands of articles on the subject have - without exaggeration - appeared in scientific journals.

No need to review these publications here; citing Wikipedia suffices. It states the following: "Dark matter is a component of the Universe whose existence has been inferred solely from its gravitational effects on visible matter and the cosmic microwave background radiation; it neither emits nor scatters electromagnetic radiation and does not participate in the strong (nuclear) interaction. The hypothesis of its existence is necessary to explain the discrepancies between the masses of galaxies, galaxy clusters, and the Universe as a whole - as determined by their dynamical characteristics - and the masses of the visible matter they contain, such as stars, gas, and dust from the interstellar and intergalactic media".[4]

New theories are emerging that eliminate singularities in the Universe's origin and in the structure of black holes.[5] At the same time, new theories attempt to identify dark matter or modify the ΛCDM model to better align with observational data.[6,7] Thus, "refinements" continue to be introduced to reconcile the theory with astronomical observations.

Because astrophysicists do not detect sufficient mass within galaxies, they posit that dark matter plays a vital role in galaxy formation and binds them gravitationally. However, three galaxies have been discovered whose properties indicate an absence of dark matter.[8,9] Similarly, an international team of astronomers observed the ultra-diffuse galaxy AGC 114905 and found no evidence of dark matter.[10] In contrast, direct, large-scale measurements of Type Ia supernova luminosities have revealed a significant discrepancy with the ΛCDM model. This points to a change in dark energy over time in a Universe that does not currently exhibit accelerated expansion.[11]

While acknowledging the talented creative work of astrophysicists and the results they have achieved, it must be noted that they have overlooked the process of the Universe's creation; consequently, their contribution to the understanding of the Universe is generally considered inadequate. At the same time, the results of astronomical research can be regarded as dependable.

Hierarchical structure of the Universe

Systems theory holds that instability increases with system complexity, implying that large systems should not exist in nature, a conclusion that contradicts empirical evidence. Analysis shows that only large, hierarchically organized systems can remain stable. Conversely, all other systems are bound to cease existing during evolution because of their inherent instability. Thus, any large natural system evolves into a hierarchical structure.[1,2]

The formation of a hierarchical structure relies on the following principles:[1,12]

1. The supreme law of the Universe is the Law of Unity.[13]
2. The general hierarchical principle: everything in the surrounding world possesses a hierarchical nature.
3. The principle of information compression: each higher hierarchical level (HL) is always simpler than the preceding one. Consequently, information rising from a lower level to a higher one undergoes compression at each successive HL. Thus, information regarding processes at lower HLs moves exclusively in a "bottom-up" direction. Information propagating in the opposite direction ("top-down") takes the form of "directive instructions" only.
4. The principle of hierarchical similarity: in terms of its fundamental structural and functional characteristics, each HL mirrors the system as a whole.
5. A hierarchical analog of the second law of thermodynamics: each higher hierarchical level possesses lower informational entropy than the preceding one.
6. A hierarchical analog of the third law of thermodynamics: the highest level of a closed hierarchical system is characterized by zero informational entropy.

7. At the apex of the hierarchical system, there exists a state where information converges and from which directives, solutions to problems posed at lower levels, and the like are issued to those lower levels. Such a state can correspond only to the Supreme Leader of the hierarchical system[1] - in other words, the God of the system - as reflected in Table 1.

Several hierarchical structures can be cited as examples (Table 1). As shown in Table 1, level No. 7 of one hierarchical structure (an organism, a human being) can serve as the lowest level (No. 1) for another (humanity).

No.	Hierarchy of the organism	Hierarchy of humanity
1	Cell	Man
2	Element (fiber)	Family
3	Fabric	Local environment (family, team, friends, neighbors)
4	Monofunctional organ (lobule)	Macro environment (territorial systems)
5	Multifunctional body	State systems (departments)
6	System	State
7	Organism	Humanity
8	God of the system	God of the system

Table 1. Examples of hierarchical structures.

The law of hierarchical structures dictates that the Universe's structure resembles that of a living organism. Furthermore, when considering the Universe, each hierarchical level corresponds to a specific type of interaction among the elements at that level (Table 2).

HL	Substance	Interaction	Reaction
1	Elementary particles	Weak	Particle decay and lepton scattering on baryons
2	Atomic nuclei	Strong	Interaction between baryons
3	Atoms, molecules, molecular systems, plasma	Electromagnetic	Interaction between charged particles
4	Planetary systems (stars with planets)	Gravitational I	Interaction between gravitating bodies within a planetary system
5	Stellar systems (galaxies)	Gravitational II	Interaction between stars within a galaxy
6	Galaxy clusters	Gravitational III	Interaction between galaxies (cellular structure of the Universe)
7	Metagalaxy	Gravitational IV	Interaction between galaxy clusters
8	God of the system		

Table 2. Hierarchy of the Universe's structure

Modern physics identifies only four types of physical interactions, weak, strong, electromagnetic, and gravitational, and consequently assumes the gravitational constant G is uniform across all levels of the Universe. However, when considering the Universe's hierarchical structure, we must acknowledge four distinct types of gravitational interactions. It follows that each is characterized by a different value for the corresponding gravitational constant.

We can construct a hierarchical system encompassing all life on Earth. All living things constitute a single, unified living organism in which perfect conditions for life have been established. Such perfect conditions imply that all ecological niches are filled (perfect life entails ideal ecological conditions, the absence of waste and pollution, closed-loop production, and recycling cycles, etc.).[14] Based on the concept of unity as the supreme Law of existence, it becomes evident that by harming the environment and destroying entire species of plants and animals, we are - figuratively speaking - severing an organ of this unified organism, thereby making it. This process is exacerbated by the prevalence of violence in the human world - among individuals, tribes, nations, and states - resulting in the death of people and other living beings on Earth. Yet vital organs (such as the brain, heart, liver, and kidneys) whose removal would kill the organism exist. Consequently, all life, including humanity, would perish. The cause lies in the greed of certain groups and their thirst for power, a thirst so clouding the mind that they fail to see the criminal nature of their actions. While modern science understands environmental issues, strong resistance still prevents us from resolving them. Consequently, the Earth and all living things upon it suffer, facing their own destruction.

A single organism could not function if the structural and functional principles of its living elements (such as DNA, RNA, and proteins) differed in ways that prevented the organization of a complete, zero-waste "production" cycle, that is, the organism's own vital processes.

Creation of the Universe in the UMIE model

From the foregoing, we see that the initial entropy of the creation of the Universe must be minimal, that is, zero. Only under this condition does the hierarchical structure of the Universe, in which all elements rotate, emerge. It follows that, at the initial moment, the embryonic Universe must contain neither matter nor energy. Furthermore, an independent cause must account for the existence of space and time, characterized by their constant motion. Based on these premises, the Minimal Initial Entropy (UMIE) model of Universe creation[15–17] was developed - a model in which all physical laws are satisfied.

In the UMIE model, the beginning is marked by the creation of a Super-Universe embryo, represented as a stratified space with four layers[15]: zero-dimensional space (World-1), one-dimensional space (World-2), two-dimensional space (World-3), and our three-dimensional space (World-4).

At the inception of the Super-Universe, each layer is represented by a space with compactified coordinates of fundamental dimensions corresponding to the Planck length and Planck time.

The first layer has 12 compactified spatial coordinates, plus temporal and informational coordinates. The second layer has three compactified spatial coordinates, one of which eventually unfolds as a two-dimensional spatial brane. The third layer has three compactified spatial coordinates, two of which eventually unfold as three-dimensional spatial branes. The fourth layer has six spatial coordinates, three of which unfold into four-dimensional spatial branes. In this arrangement, the radius of the manifested coordinates in all layers expands at the speed of light. The temporal and informational coordinates are shared across all layers of the stratified space. This structure of the Super-Universe is determined by the informational space.

The 12 compactified spatial coordinates of the zero-dimensional space encompass all spatial coordinates of the stratified space, enabling interaction between processes in the zero-dimensional space and those in other spaces.

The inception of the Super-Universe is marked by the entry of a Scalar Field (SF) at a constant speed through zero-dimensional space.[17] The information coordinate generates layers in a stratified space, establishes the hierarchical structure of the future space, and endows the SF with all necessary properties. The SF carries the program (universal code) for creating the Super-Universe. Simultaneously, time is introduced into the Super-Universe. Since all coordinates of World-1 are closed into circles of small radius, the SF wave must be circularly polarized. This, in turn, implies that all matters created within the Universe must possess angular momentum; everything rotates, from atoms to galaxies.

The information space determines the material structure of the future three-dimensional space - that is, it assigns positions to the coordinates of future stars, galaxies, and galaxy clusters. The SF localizes in the vicinity of each elementary particle, giving rise to the particle's mass. The total mass of all particles constitutes the mass of matter. The SF drives particle-antiparticle annihilation. This process releases energy $E = 2mc^2$ and creates a vacuum particle with all quantum numbers equal to zero. In the electric field of an atomic nucleus, the vacuum particle becomes polarized, allowing it to absorb an electromagnetic wave and potentially create a particle-antiparticle pair.

The newly formed three-dimensional space will initially contain only elementary vacuum particles[17,18] and zero-point oscillations of physical fields. A massive influx of SF energy will excite vacuum particles and create material particles. Crucially, these particles must be protons and antiprotons. In the vicinity of nucleons, the SF generates bineutrons or complexes of bineutrons.[19] Subsequent bineutrons are created primarily near existing particles, thereby increasing the mass of atomic nuclei. This process creates and proliferates all possible atoms at the sites where future stars will form. Future stars and galaxies quickly acquire the angular momentum needed to maintain the Universe's hierarchical structure. Primordial planetary systems form once a young, rapidly rotating star attain sufficient mass, allowing future planets to separate from the star's outer regions.[20]

This model, which used the Law of Unity and Similarity,[15,16] showed that the gauge field responsible for fundamental interactions arises from introducing the SF into the Universe. Thus, the SF carries information about the Universe's hierarchy and ensures all physical interactions exist.

Next, let us consider gravitational interactions. The SF, characterized by 12 spatial coordinates and a temporal coordinate, can extend beyond a black hole's boundary, creating the conditions for a multidimensional gravitational field associated with black holes. This conclusion stems from the fact that black holes, while three-dimensional objects, do not emit light quanta due to their gravity, yet they do emit gravitational-field quanta.

Based on phenomenological considerations, physicists describe gravitational interaction-much like other interactions, particularly the electromagnetic one-as an exchange of gravitons between interacting masses. However, in doing so, they overlook that electromagnetic

interaction is described by a vector field, whereas gravitational interaction is described by a tensor field. Furthermore, electromagnetic interaction is three-dimensional, while gravitational interaction is multidimensional.[21] Only the hierarchical structure of the Universe (Table 2) allows for the description of gravitational interaction. The ratio of gravitational to electrostatic interaction for an electron-proton pair is $k_{ep} = 4.4126 \cdot 10^{-40}$, while for a proton-antiproton pair it is $k_{pp} = 0{,}808 \cdot 10^{-36}$. The latter ratio matters here because, in nature, gravity acts only between large masses, specifically nucleons.

In the one-dimensional space of the Super-Universe, Planck particles exist. The ratio of gravitational to electrostatic interactions between a pair of Planck particles is close to unity. This fact suggests considering gravitational interaction not in the Universe, but in the stratified Super-Universe. Since the graviton wave is multidimensional, it can immediately take advantage of a delocalized point of interaction between the three-dimensional Universe and the two-dimensional and one-dimensional worlds.

In article,[21] it is shown that the interaction of a separate element of the HL ensures temporal unity and, with respect to all other elements at the same level, their interaction. Temporal unity means that within the time limit $\Delta t = h/mc^2$, the unity signal will cover the characteristic (smallest) element of the HL. This leads to different gravitational-field properties at different HLs.

By leveraging its multidimensional nature and the informational interaction between the layers of a stratified space - mediated by a delocalized point - the Scalar Field "knows" the coordinates of all masses in the Universe.[17] Consequently, it can always facilitate interaction between massive bodies (such as planets or stars) or massive systems of bodies (such as galaxies).

An analysis of gravitational field properties across different interaction ranges, presented in,[21] demonstrates that the gravitational interaction constant (γ, G) within a galaxy is significantly larger than the corresponding constant within a planetary system. Conversely, the gravitational interaction constant between galaxies is significantly lower, and between galaxy clusters is still lower than that of a planetary system. This phenomenon can be interpreted as galaxies' accelerated recession.

Thus, the Universe's hierarchical structure makes it clear that galaxies do not require dark matter to maintain stability.

On the other hand, the variable characteristics of dark matter revealed in astronomical studies indicate that it does not form a hierarchical structure and, therefore, cannot exist. Thus, one reason the unscientific theory of dark matter and dark energy emerged is a lack of understanding of the Universe's hierarchical structure.

Conclusion

Based on an examination of the hierarchical system of the Universe and physical interactions across all levels of organization, the following has been demonstrated:

1. The standard model of the Universe's formation cannot describe all the observable processes without violating the laws of physics and life.
2. The UMIE model makes it possible to describe all processes in the Universe without violating the laws of physics - specifically, the creation of matter without antimatter and the formation of all known chemical elements, including heavy ones.
3. According to the UMIE model, the informational dimension determines the hierarchical structure of the Universe, with all its elements undergoing rotation. As stellar embryos gain mass, their rotation leads to planet formation in their outer regions. From the beginning, stars group into galaxies, which also possess angular momentum.
4. The hierarchical structure of the Universe gives rise to seven physical interactions. Of these, the weak, strong, and electromagnetic interactions manifest in three-dimensional space, whereas gravity is multidimensional. The multidimensional nature of gravitational interaction accounts for the small magnitude of the interaction constant (γ, G), as the interaction operates within the one-dimensional and two-dimensional layers of the Super-Universe. This facilitates the instantaneous transmission of interaction between stars, galaxies, and galaxy clusters.
5. The magnitude of the gravitational interaction constant within the galaxy significantly exceeds the magnitude of the constant within the planetary systems, which ensures the stability of the galaxy structure.
6. The magnitude of the gravitational interaction constant is significantly reduced at higher HL scales, which may be perceived as the accelerated recession of galaxies.
7. The dark matter being sought in the Universe lacks a hierarchical structure and, therefore, cannot exist.

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