

# **Theoretical research**

## **"Analysis, design and manufacture of space systems based on new physical principles"**

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The problem of analyzing, designing, and manufacturing space systems based on new physical principles, namely, using the AUfield, is considered (see "A new Understanding of the nature of Dark Energy and dark Matter" [1]).

### **Introduction**

The current crisis of the industrial phase of human development raises the question of the future path of development. The crisis of the industrial phase of development is a crisis of globalization, a crisis of consciousness and self-awareness in the context of new technologies, a crisis of the family. As a result of this crisis, Humanity must learn to live in new realities, as it previously learned during the transition in the past from one previous phase to another. It should be mentioned here that this is not the first such crisis. In the past, we have behind us the Neolithic catastrophe, the Bronze Age catastrophe within the fertile crescent in the Middle East, the crisis of late antiquity within the Roman Empire, and the crisis of the 14th century in medieval Europe. It was a difficult path of formation of our civilization long in the millennia from the archaic, through the traditional and industrial phases of development. One of the necessary conditions for overcoming the previous crises was to go beyond globalization. And now either Humanity will be mired in wars and cataclysms for many centuries, tied to one planet on its way to degradation, self-destruction and a Long Night, or it will make efforts on its way to settle on other planets, both in the Solar System and in other star systems. However, there will also be crises, catastrophes, and wars along the way. But it will be a thorny path of life, which will help to pass space systems using the AUfield.

### **What is an AUfield?**

Every event finds its mention. Behind any matter, behind any event in the universe, there is energy in one way or another. This is a single measure of the various forms and interactions of matter, a measure of the motion and force of the transition of the motion of matter from one form to another. Everything is somehow a transformed form of energy. All events somehow leave their mark, information about themselves. Information is also a transformed form of energy. Every event, every disturbance of

probability, leaves its own energetic trace in space-time. If we consider the universe to be a closed system, then, guided by the law of conservation of energy, we can say that dark energy is a log of the events of the Universe-Acta universi, if you want, then the book of life of the Universe. In the future, for simplicity, we will call the Acta universi – AUfield. In this AUfield, every event is reflected, mentioned, which leads to its expansion and increase.

It is known that the gravitational properties of dark energy are different from other forms of energy. Dark energy is not collected in clumps. Its density is uniform and varies slightly over time. With the negative pressure inherent in dark energy and, as mentioned above, a constant density, dark energy increases in volume, and the volume of the Universe increases along with it. Of course! There are many different events in the Universe that leave their information and energy trace, which we observe in the form of dark energy. Events are moving, energies are raging, matter is interacting everything is flowing, everything is changing, the log of the universe is growing, the universe is expanding - which is what we are seeing.

If dark energy is an AUfield, then following the law of conservation of energy, dark matter can be interpreted as a kind of dump, counterweight, by-product of imprinting in the AUfield, a kind of book of life of the Universe. It is even somewhat unsurprising that dark matter is usually found around event centers – galaxies, clusters of galaxies. Metamorphoses of matter lead to the expansion of the "book of life" of the Universe and the mass of dark matter. Any fluctuation in probability leads to an expansion of the universe. The AUfield expands the universe.

In the AUfield, the concepts of space and time collapse. The AUfield contains any object, any event, anywhere and always. When trajectories collapse, it doesn't make sense to determine the coordinate, time, or trajectory. There is only a phase space of correlations, which consists of ensembles of fluctuations and perturbations. Here, an ensemble is an imaginary set of identical systems with different initial conditions.

## Types of ensembles

1. Standard model. The Standard Model of Particle Physics is a theory that describes three of the four known fundamental forces (the electromagnetic, weak, and strong forces excluding gravity) in the universe and classifies all known elementary particles.
2. Time. Time types:
  - Ontological time (transcendental, eschatological, teleological): The time of Scripture, the time of Sartre, Heidegger. Spiritual, non-linear, discontinuous (discrete), finite time, is given by Revelation. (The Quantum Observer). [2], [15]

- Thermodynamic time (biological, geological, evolutionary): Boltzmann, Clausius, Prigogine [3], Bertalanffy. Live, non-linear, directed, inhomogeneous, finite, observable / computable time. (Ontological observer) [2], [15]
- Metrological time (physical, mechanical, and geometric): Newton, Einstein, and Wheeler time. Dead, linear, directed, uniform, infinite, measurable time. (Live observer) [2], [15].

### 3. Operators of being, non-being, and otherness.

B (Being), N (Non-being), O (Otherness)

NNN (non-existence of non-existence is non-existence) – Red Road. Absolute nothingness

NNB (non-existence of non-existence is being) is a classic Black Road.

NNO (non-existence of non-existence is otherness) - Beige Road, quantum fluctuations are NOTHING, generating Something Else.

NBN (non-existence of being is non-existence) - Yellow Road, anti-creation.

NBB (non-existence of being is being) - Purple Road, determinism, wheel of Samsara

NBO (non-existence of being is otherness) - the Emerald Road, the region of the miraculous.

NON (non-existence of otherness is non-existence) - Raven-colored Road – the fall of Satan.

NOB (non-existence of otherness is being) - Mother-of-Pearl Road – the Fall

NOO (non-existence of otherness is otherness) - Silver Road (all paths lead to God)

BNN (the being of non – being is non-being) - A Gray Road, an endless wandering, an ontological exorcism, an interweaving that does not form a whole.

BNB (the being of non-being is being) - A Green Road, a creation from nothing.

BNO (being of non-being is otherness) - Bleached Road, Lovecraftianism, Cthulhu's lair.

BBN (being of being is non-being) – Blue Road, Black hole (of Being), Abyss, Ungrund.

BBB (being of being is being) - Golden Road, Being

BBO (being of being is other-being) - White Road-synergy, my will and the will of God are united in a single action, in a single will. To some extent, techno/scientific magic, the creation of foreign worlds.

BON (the existence of otherness is non-existence) – Absolutely Black Road, Hell.

BOB (the being of otherness is being) is an Apple-green Road, materialism in its complacency.

BOO (the being of otherness is otherness) - Purple Road, ascent to otherness, monasticism.

ONN (otherness of non-existence is non-existence) - Amethyst Road, High Paganism, ancient Gods, pagan Olympus

ONB (the otherness of non-being is being) - The Linen Road," The Little Prince " by A. de Saint-Exupery.

ONO (otherness of non-being is otherness) - Crimson Road (???)

OBN (the otherness of being is non-being) - The Silver Road (germination, pecking, emergence with the death of the previous one-a butterfly from a chrysalis...)

OBB (the otherness of being is being) - Amber Road, cyclical modes of Being.

OBO (the otherness of being is otherness) - Azure Road, deification.

OON (otherness otherness is non-being) - Wuthering Road, the Last Judgment

OOB (Otherness of otherness is being) - Dark Blue Road, Salvation through the Sacrifice of the Cross

OOO (otherness otherness is otherness) - Cobalt Road, the ultimate Otherness. [2]

#### 4. Locality and non-locality.

Local and non-local correlations. Local-these are all correlations that science operates with outside of quantum physics, can be explained by the influence of one phenomenon on another. Interaction and information transfer are carried out by a chain of events. Effect follows cause. The reason is transmitted from point to point, without jumps or breaks. Cause and effect are inextricably linked. There is no cause without effect, and there is no effect without cause. The cause propagates continuously in space from the original local point. In this sense, we will call correlations local-they all have a local starting point in time and space.

Non-local correlations are correlations where no information is exchanged. For example, as a result of quantum entanglement, a non-local whole is formed. Imagine that you have two cars. You hand them over to the service for repair. They are disassembled there in some way for repairs. Perform repairs, collect them after repairs and give them to you. And as a result of repairs, cars acquire unusual properties. You get behind the wheel of one of the cars and go on a trip. If necessary, you can manipulate the controls, turn on and off the high and low beam, turn

signals, and car radio. And at the same time, your second car in the garage begins to turn on and off turn signals, turn the wheels, play the radio, so to speak, synchronously with the devices of your first car. In fact, in theory, any object can be entangled. But so far, entanglement has been demonstrated for photons, atoms, and elementary particles. The largest objects that were connected were crystals. [4] An interesting question may be the entanglement of all elementary particles in the universe to some extent, which could arise as a result of the evolution of the universe.

5. Special theory of relativity.
6. General theory of relativity.
7. An ensemble of fluctuations. [3]
8. Combined ensemble. An ensemble based on connections and intersections of elementary event spaces of other ensembles.

### **Quantitative comparison between a neural network and a cosmic web [5]**

The data available from the literature allow us to make the first schematic comparison of the absolute sizes of both systems. The radius of the observable Universe is  $R_U \sim 13.9$  Gpc [1-3]. Extrapolation of recent observations shows that a total of  $N_g \sim 2.6 \cdot 10^{12}$  galaxies can be present within the sphere of the observable universe [6], with up to  $\sim 5 \cdot 10^{10}$  galaxies with masses equal to or greater than the mass of the Milky Way. The largest galaxy clusters have a total mass exceeding  $10^{15}$  solar masses (1 solar mass =  $1.989 \times 10^{33}$  g). Long filaments of ordinary and dark matter with a length of several tens of megaparsecs connect clusters and groups of galaxies and are separated mainly by empty space [14], [5].

According to recent estimates, the adult brain contains  $N_{neu} \approx 8.6 \pm 0.8 \cdot 10^{10}$  total neurons and an almost equal number of non-neuronal cells. Only  $\sim 20$ - $25\%$  of most neurons are located in the gray matter of the cerebral cortex (representing  $\sim 80\%$  of the brain's mass), while the cerebellum has about  $\sim 6.9 \cdot 10^{10}$  neurons ( $\sim 80\%$  of brain neurons) [5], [7], [8].

You can see that the two systems are organized in well-defined networks, with  $\sim 10^{10}$ – $10^{11}$  nodes connected by filaments (if we consider all galaxies with masses comparable to or greater than the mass of the Milky Way, see above), the typical length of which is only a tiny fraction ( $\leq 10^{-3}$ ) of the size of their host system. In addition, galaxies and neurons have a typical scale radius that is only a very small fraction of the typical length of the filaments they are connected to. Moreover, the

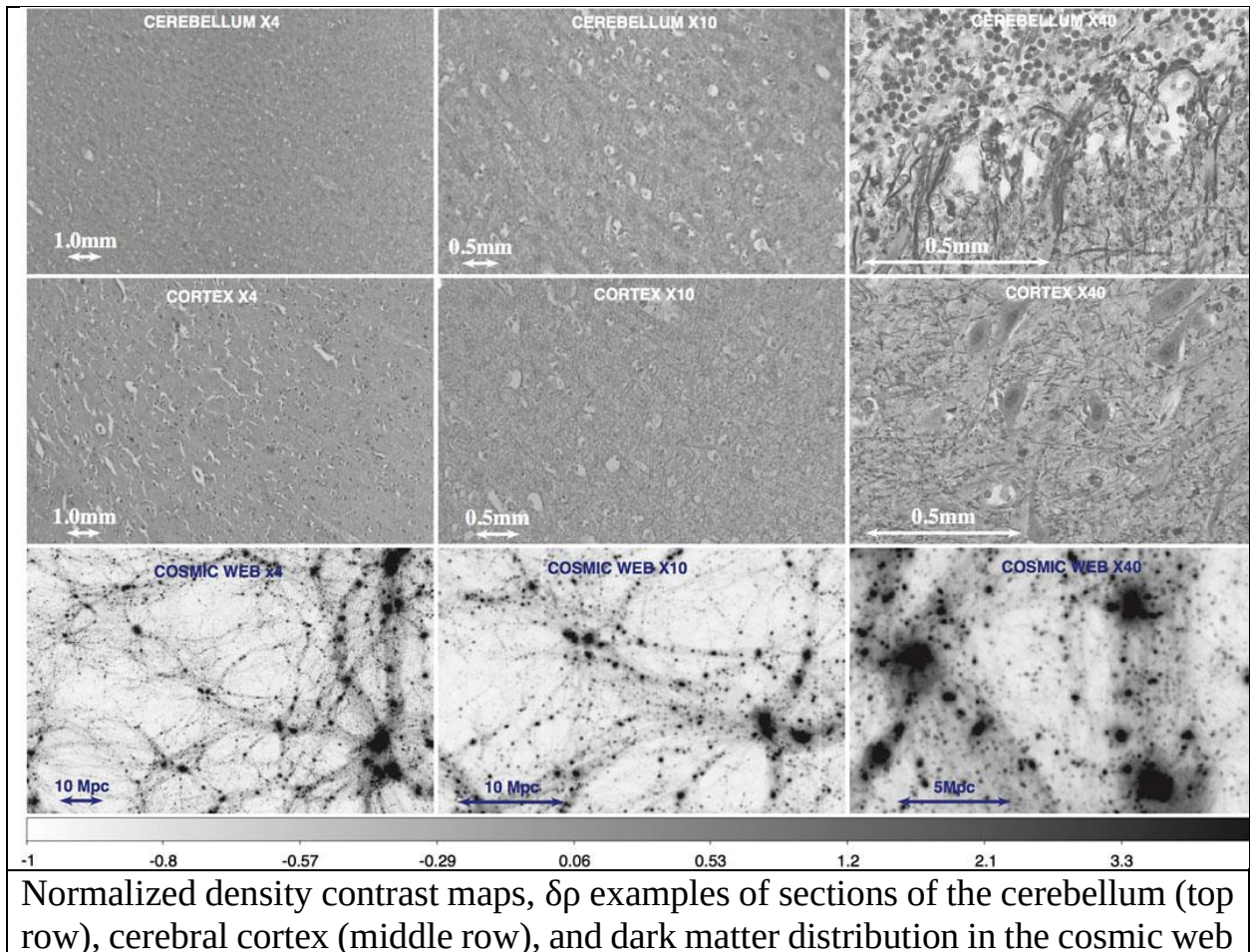
available data indicate that the flow of information and energy in the two networks is mostly limited to  $\leq 25\%$  of the mass / energy content in each system. [5]

In the case of the universe, we refer to the current composition based on the collaboration of Planck et al. [9], where the relative energy distribution is a function of time in  $\Lambda$ CDM cosmological model; for the human brain, we referred to published studies on the composition of the human brain. [5], [10] and [11].

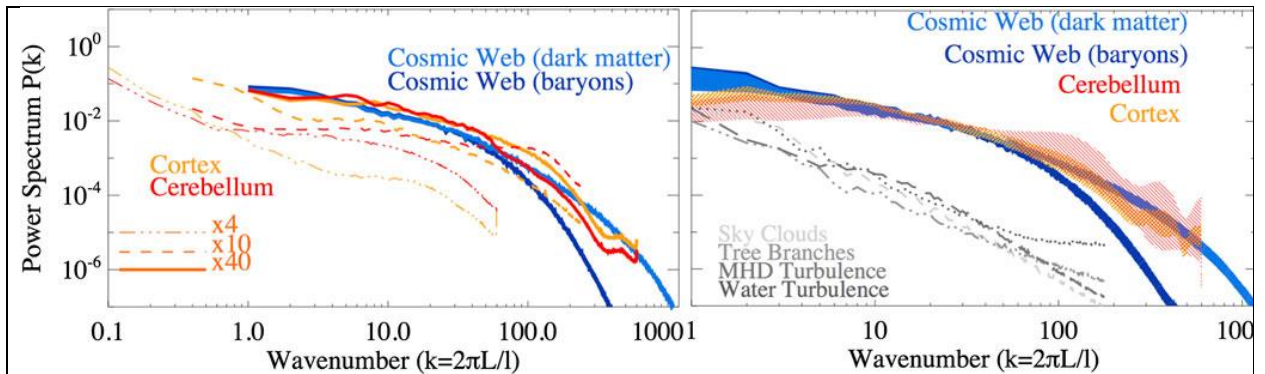
In short:

- the brain consists of water (77-78%), lipids (10-12%), proteins (8%), carbohydrates (1%), soluble organic substances (2%), salt (1%); [5]
- the universe is created for 73~% with Dark energy (the scalar energy field of empty space), for 22.5% with Dark matter, for 4.4% with ordinary baryonic matter, and for less than  $\leq 0.1\%$  with photons and neutrinos. [5]

In both cases,  $\sim 75\%$  of the mass / energy distribution is made up of apparently passive material that permeates both systems and plays only an indirect role in their internal structure: water in the case of the brain and dark energy in cosmology, which largely does not affect the internal dynamics of cosmic structures. [18] [5]



(bottom row) for different magnification levels are given. The spectral and network analysis presented in this paper will mainly focus on 40× samples, as in the right-hand panels. [5], photos from [5]



On the left: power and density spectra of all samples (for brain samples, cross-sectional spectra of different sizes and magnification factors are shown). On the right: power and density spectra (in the case of brain tissues, only 40× slices are used here), and the shaded areas cover the entire spectrum distribution for all samples (12 slices for space web samples and four for brain samples). Comparison of power spectra from other samples of natural systems is shown in gray lines. [5], charts form [5]

## Cognitiveness and thought forms

The undoubted similarity of the neural network and the space web allows us to conclude that the processes occurring in the neural network and in the space web are similar.

It is also necessary to assert that the processes taking place in the cosmic web will be captured in the AUfield (now widely known as "dark energy").

This leads to the conclusion that the processes occurring in the neural network, will be captured in the AUfield. That is, it is possible to use an artificial neural network to make changes in the AUfield so that an object moves along the cosmic web without having the restrictions imposed by the special theory of relativity. If it is a spaceship, then it will be a ship capable of making interstellar flights in a reasonable period of time by human standards.

This requires an artificial neural network on board the ship that has the appropriate cognitive parameters, is capable of analyzing local parts of the cosmic web, generating thought forms of the necessary sections of the cosmic web, modifying thought forms of the web, and then sending the modified thought forms to the actuators for correcting the AUfield so that the ship moves (makes a jump or a series of jumps) to your destination in the cosmic web.



It can also be argued that what is now commonly called "artificial gravity" and a certain "force field" that can affect matter, may have a physical nature, resulting from manipulations with the AUfield ("dark energy").

We can safely say that additional research is needed on all of the above issues. This research will allow Humanity to become an interstellar species. Our human descendants will find inexhaustible opportunities for settlement and inexhaustible resources of the universe.

### **In summary**

1. According to the new model, dark energy is a log of the events of the universe-Acta universi, if you want, the book of life of the Universe. In the future, for simplicity, we will call the Acta universi – AUfield. In this AUfield, every event is reflected, mentioned, which leads to its expansion and increase. In the AUfield, the concepts of space and time collapse. The AUfield contains any object, any event, anywhere and always. When trajectories collapse, it doesn't make sense to determine the coordinate, time, or trajectory. There is only a phase space of correlations, which consists of ensembles of fluctuations and perturbations.
2. The AUfield is described by the following types of correlation ensembles:
  - Standard Model of Elementary Particle Physics.
  - Time.
  - Operators of being, non-being, and otherness.
  - Locality and non-locality.
  - Special theory of relativity.
  - General theory of relativity.
  - An ensemble of fluctuations.
  - Combined ensemble. An ensemble based on connections and intersections of elementary event spaces of other ensembles.
3. A quantitative comparison between the neural network and the Cosmic Web suggests that they are similar.
4. The similarity of the neural network and the space web allows us to conclude that the processes occurring in the neural network and in the space web are similar.
5. Coupling the neural network and the space web will allow you to make changes to the AUfield so that the ship moves (makes a jump or a series of jumps) to the destination point in the space web.
6. More research is needed on all of the above issues.



## Conclusion

More research is needed on all of the above issues. This research will allow Humanity to become an interstellar species. Our human descendants will find inexhaustible opportunities for settlement and inexhaustible resources of the universe.

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