

LIVING UNIVERSE AND HIERARCHICAL THERMODYNAMICS

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ABSTRACT

The desire for simplicity - the only basis of generalization allows us to create a model of life (existence) of the universe at all hierarchical levels. This model, using a broad understanding of life, is an extended Darwinism - the physical foundation of which is hierarchical thermodynamics, governed by the principle of substance stability. The evolution of the universe is a combination of the numerous cyclic transformations of matter and energy at all hierarchical levels of transformation occurring against the background of a constant change in the physical parameters of evolving systems. Life in this broad sense of the term proceeds at almost infinite disparate speeds in different-scale structural hierarchies, consisting of clusters of galaxies, galaxies, planetary systems, geological objects, clusters of chemicals, biological organisms, environmental, social and other systems.

The broad definition of life used in the present work, significantly different from the concept of "biological life". Biological life takes place in a relatively narrow range of temperatures, pressures, and other physical parameters. It is a relatively narrow concept, distinguished by its internal multi-hierarchy and almost endless evolutionary diversity, which significantly distinguishes it from other forms of life in the universe. Undoubtedly, purines and pyrimidines, the "main building blocks" of biological life, which are thermodynamically stable at high temperatures, will be found in stellar atmospheres. Other fragments of nucleic acid chains also exist in temperature and pressure zones, where they are relatively thermodynamically stable. It should be noted that the existence of nucleobases, other fragments of nucleic acids, as well as fragments of many biomolecules found in space. Thus, it can be argued that the "molecular bricks of biological life" move in the required quantities from zones of their relatively thermodynamic stability to zones acceptable for the origin and development of biological life. Further, biological life evolves according to the well-known Darwinian scenario. Hierarchical thermodynamics, as the driving force of evolution, does its job at all levels of the hierarchical structures of universe, supporting the life of the universe.

Keywords: evolution, life, biological life, universe, hierarchical thermodynamics