Abstract

In this book using the Law of similarity and the Law of unity a model of creation and evolution of the Universe in which the laws of physics are performed. The model implies that our Universe is a part of a Super-Universe as a separate layer in the fiber space, and the information communication exists between adjacent layers through the single point. During the formation of Super-Universe it was filled first a one-dimensional World of Field-time, then a two-dimensional (1 + 1) World was filled with energy and Planck's particles which carry the electric and magnetic charges. Completion of two-dimensional World filling leads to an "overflow" of energy into the neighboring three-dimensional World which presents a world of known quarks which have the fractional electric charges, color charges, and spins. The next step is an "overflow" of energy into the four-dimensional (3 + 1) World and the birth of the particles of this World. Evolution of this World has a completion by the brane creation of five-dimensional World. The proposed model supports the anthropic principle in the Universe.

In this book on the basis proposed by the author of the model creation of the Universe as part of the fiber bundle Super Universe considered scheme of weak interactions in two adjacent spaces: two-dimensional space (World-3) and our three-dimensional space (World-4). This analysis allowed us to describe the processes of weak interaction adequately describing the known experimental results. In particular, the work established that the bosons $W^{\pm}$ and Z^{o}, responsible for the weak interaction, there must be a part of his in the World-3, and the other - in the World-4. In the course of the weak interaction a virtual boson is emitted and absorbed by the same particle (quarks, hadrons). This $W^{\pm}$ - boson during the its existence turns into Z^{o}- boson, forming a particle-antiparticle pair (quarks in the World 3 and leptons in the World 4). Scattering and transformation of leptons is only possible on bosons $W^{\pm}$ and Z^{o}, emitted by nuclei. In addition, the book describes the mechanisms of instability of tau leptons: 1) inelastic interaction with nuclei for causing pions $\pi^{\pm}$ or π^{o} and tau lepton-neutrino, 2) the spontaneous decay of heavy leptons in the lungs, and 3) the reaction of the weak interaction.

In the book a probable mechanism of the matter creation in the Universe is proposed, starting from the Big Bang, in which the initial entropy is minimal (cold Universe), and the nuclear reactions are shown which have led to the creation of all stable and unstable nuclei known at the present time. In particular, it is shown that heavy nucleus, and than the rest of the nucleus, born and bred from a primary matter, which appeared at the time of the Big Bang, due to the fact that in the vicinity of atomic nuclei are born particulate matter in the form of bineutrons or clusters of three bineutrons by the energy Fields. The birth and breeding of heavy nucleus in the central regions of the stars are responsible for the stellar radiation. Similar processes in the central regions of the planets cause their heating. The proposed mechanism explains the high proportion of hydrogen and helium in the matter of Universe.

In book on the basis of new ideas about the origin and evolution of the Universe, the Laws of similarity and unity in the Universe describe the structure of the heavy ($Z \geq 4$) cores, as well as the hierarchy of interaction bosons. In particular, the amount of charges attributed particles in different layers of a stratified Super-Universe is shown that in three dimensions the particles should have fundamental electric charges are 0, ±e, ±2e, ±3e, which correspond to the three pairs of light stable nuclei (hydrogen, helium, lithium). All heavy ($Z \geq 4$) cores are presented in the form of molecular structures consisting of light nuclei; shows the causes of instability of the nuclei in the ground and excited states. Shows the hierarchy of bosons is responsible for the interaction between particles in different hierarchical layers of fiber space Super-Universe.

The work based on the model developed by the author earlier birth of the Universe with a minimum initial entropy of the mechanism of the birth of the star and planetary system. This is

taken into account that the birth in the Big Bang the Universe had a fractal structure and a limited amount of matter density. Created fractals rotated with relativistic velocities. The new substance is poured into the Universe at a constant speed in a bineutrons created directly scalar Field. These bineutrons created in the vicinity of atomic nuclei of which was the primary matter of the Universe. With the expansion of the Universe is expanding, and the localization region of star and planetary system. The total angular momentum of the star and planetary system were increased. This star has passed the phase of a disk-shaped periphery that is separated from the main mass of the star, forming the future of the planet. With a certain probability the primary star could be divided into two or more stars. The resonant interactions between the orbits of the planets have led to the regular arrangement of the planets in the equatorial plane of the star. It is shown that in the early stages of evolution of the universe with high efficiency, first born heavy atoms, which explains the presence of unstable atomic nuclei in the world with a mass greater than lead. It was concluded that heavy atoms form the basis of the central regions of stars and planets.

The work based on the model previously developed by the author of origin of the Universe with a minimum initial entropy of the considered properties of the scalar Fields is responsible for the birth of matter in all layers of the fiber bundle Super-Universe and makes it possible to explain all the known processes occurring in the Microcosm and the Macrocosm of our Universe. It was concluded that the Field generates all known fields in the Universe; the presence of the mass of elementary particles is due to the influence of the Field, ever-present in the Universe; The Field is characterized by high degree of symmetry in a multidimensional space, as well as two states: positive and negative energy; the integrity of the Universe provides instant transfer of information within the entire Universe, which is provided by the properties of the fiber bundle and Fields and enables the mutual feeling of the particles in the Universe; the Field sets of discrete time in our Universe (time slice Δt_o = 7.36·10^{-}85 s); interaction of a particle with an antiparticle through the Field leads to the formation of vacuum particles; World of Field-time is an inexhaustible source of energy that can be used mankind.

The work considers the nature of the strong interaction in the Standard Model and in the model of the Universe with a minimal initial entropy. It is shown that many of the shortcomings of the theory of the strong interaction, adopted in the Standard Model, are eliminated in the model of the Universe with a minimal initial entropy. The new model is based on the fact that each particle in the fiber bundle of Super-Universe, with its mass is also the carrier of a Scalar Field. This Field is fully controls the emission and absorption of gluons, the birth of virtual pairs of particles from vacuum, a taking part of gluons and virtual particle pairs in the strong interaction processes. In the vicinity of hadrons or groups of hadrons with the same electric charges Scalar Field can produce only neutral pions. At the birth of the virtual pion π^o in the neighborhood of nucleon the energy Fields of the nucleon decreases. Moving to another nucleon pion is accompanied to the displacement of Field energy in the opposite direction. Return of the pion in the vacuum state recovers energy of nucleon Fields. The process of creation and recombination of virtual pairs is oscillatory process, which is repeated endlessly. The total scalar Field of the proton and the neutron has the ability to initiate a virtual pair ($\pi^-\pi^+$), that in the World-3 means the simultaneous formation of two quark virtual pairs $^{-1/2}d(\alpha)^{1/2}\overline{d}(\overline{\alpha})$ and $^{-1/2}u(\alpha)^{1/2}\overline{u}(\overline{\alpha})$ and their polarization in the Coulomb field of the proton and their conversion into two charged virtual pairs $^{-1/2}u(\alpha)^{1/2}\overline{d}(\overline{\alpha})$ and $^{-1/2}d(\alpha)^{1/2}\overline{u}(\overline{\alpha})$, the first of which corresponds to π^+, while the second - π^-.

The book will be useful to all readers interested in the birth and evolution of the Universe, the nature of fundamental interactions, the prospects for the development of the Universe in order to coordinate the development of human civilization with the laws of the Universe

Keywords: Model of the origin and evolution of the Universe, the fiber space, Scalar Field, the Laws of similarity and unity, Planck particles, the anthropic principle, the weak and strong interaction, elementary particles of vacuum, virtual pairs of particles, the formation of heavy nuclei, bineutrons, hierarchy of bosons, fractal structure of the substance, formation of a planetary system and double stars, a source of energy.