

THE LAWS OF THE UNIVERSE AND MICROWORLD

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ABSTRACT

This work deals with the laws of the universe and the microworld .

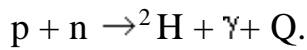
Keywords: space, Sun system, Sun system, microworld.

The elementary particle physics section of physics studies all the processes that occur in the microworld, that is, in the physics of elementary particles, their characteristics, their interactions, and the types of interactions between them. We will talk about elementary particles related to the microcosm, the history of the development of **elementary** particle physics, the concept of elementary particles, classification of particles, types of interactions, and characteristics of particles.

Information about how the universe is structured is determined by studying the long distances that can be observed using human-made instruments. If these distances are described in units of light years used in astronomy (1 light year= $9.5 \cdot 10^{12}$ km or ~ 0.3 parsec, 1 parsec $\sim 3.1 \cdot 10^{13}$ km), the distance to the most distant objects is 5000 million parsecs or 15 billion light years! The observed universe today consists of a collection of huge stars - galaxies and gases in the interstellar medium. Actually, the universe consists of matter and radiation.

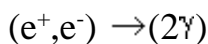
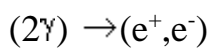
The radiation era of the development of the universe is very important. It was during this period that heavy nuclei, the basis of the elements that make up D. Mendeleev's periodic system, began to appear. This process is called nucleosynthesis. The lightest nucleus, the proton, appeared 10 seconds after the beginning of the universe. During this period, the temperature and density of the Universe was large

enough for the fusion of deuterium - a nucleus consisting of two nucleons, which was formed as a result of the collision of a proton and a neutron.

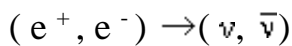


Here $Q = 2.2 \text{ MeV}$ is the energy released in this fusion reaction. Then, within 10-15 minutes, the reaction of ${}^2\text{H}$ deuterium into ${}^3\text{H}$ tritium, followed by the formation of a ${}^3\text{He}$ helium nucleus from deuterium and tritium took place. According to the calculation results, helium made up 24 percent of all nucleons. The results of the current observation also emphasize this.

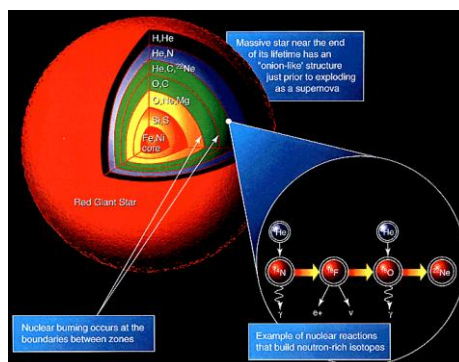
The extremely high temperature of the early universe caused particles to collide and transform into other particles. For example, an electron and a positron pair were created from two photons, and their mutual collision (the collision of a particle and an antiparticle is called annihilation) leads to the creation of more photons.



Neutrino (ν) and of antineutrinos ($\bar{\nu}$). appear to be even possible has been



The collision of a neutrino and an antineutrino, in turn, created a pair of electrons and positrons. At extremely high temperatures, particles collide and transform into other particles like a boiling "soup" in which the number of particles and antiparticles in the "soup" is equal. Along with this Universe comes the existence of the Antiuniverse.



Schematic representation of nucleosynthesis in stars.

Elementary particles related to the microcosm, the history of the development of **elementary** particle physics, the concept of elementary particles, classification of particles, types of interactions, and characteristics of particles are described based on a historical approach. Issues that need to be addressed for future integration of interaction types are discussed. The structure of the universe is divided into mega and micro worlds.

So, education if it is explained in the institutions of the natural-scientific landscape of the world on the scale of micro-, macro- and mega-worlds in a scientific-popular way, relying on the latest theoretical and experimental data, future students will enter higher education in the world he can come knowing the current situation .

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