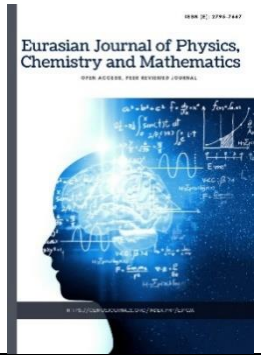

About Natural Scientific Views Of The Universe

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ABSTRACT

The article interprets the scientific view of the universe, based on the natural sciences. Some concepts of the scientific picture of the Universe include the achievements of science that determine man's place in it. In this case, the scientific picture is not a sum of general knowledge, but an integral system of ideas about the general properties, state and laws of nature.

Keywords: Newton, classical mechanics, thermodynamics, electrodynamics, optics, light, atomic and nuclear physics, quantum mechanics.

The unity and infinity of the Universe characterizes the unity of the material world. The unity of matter, the mutual circulation of micro- and macrosystems in cosmology is based on the physical vacuum, in cosmogony - on the interaction of elementary particles, in the biosphere - life, liveliness and its connection with inanimate nature.

In ancient times, attempts were made to explain all natural phenomena on the basis of Newton's laws, but later it turned out that the connections between microparticles are not based on Newton's laws /1,3/. Later it was found that the structure of the atom, the phenomenon of radioactivity and the laws of communication between elementary particles obey the laws of quantum mechanics. Considering that biological living beings also consist of chemical elements, it is natural that the laws of physics are applied in biology and chemistry. It is important to give students an idea of the scientific picture of the world and show the connections of natural sciences in lessons and extracurricular activities in secondary schools.

We turn to very ancient times to substantiate the physical foundations of natural science, the natural scientific view of the Universe. In 585 BC. e. Greek natural philosopher Thales became famous for predicting a solar eclipse /2/. Pythagoras, a Greek scientist who lived in the 6th century BC, investigated the properties of number series in arithmetic and plane figures in geometry and discovered the theorem that bears his name. At this time, the physician, physiologist and philosopher Empedocles explained that the phenomenon of a solar eclipse occurs due to the passage of the Moon between the Sun and the Earth. He realized that because light travels at such a high speed, we do not perceive the time it travels.

G. Galileo and I. Newton made revolutionary changes in mechanics in the 16th and 17th centuries. Galileo proved that any body cannot change the direction and magnitude of its speed without the influence of force, and was the first to bring mechanics to the level of a theoretical science.

The laws of classical mechanics apply to bodies of large mass moving at relatively low speeds. All Newton's laws arose as a result of a generalization of facts obtained in many experiments.

Polish astronomer N. Copernicus, in his work “On the Rotation of the Celestial Sphere” (1543), illuminates the heliocentric theory that the Sun is at the center of the Universe. During this period, the Italian scientist G. Bruno proved that the Universe has no center, it is limitless and consists of an infinite system of stars. The theory of N. Copernicus and the ideas of J. Bruno were confirmed by G. Galileo through the telescope he made; he was able to see craters and mountain ranges on the Moon, the constellation of stars that make up the Milky Way, the satellites of Jupiter and spots on the Sun.

The German astronomer J. Kepler discovered the laws of motion of the planets of the solar system. These discoveries confirmed Copernicus' theory. As a result, these ideas began to quickly spread among people. The Roman Church banned the works of N. Copernicus. In 1633, the Inquisition of the Roman Church organized a trial of G. Galileo and forced him to renounce his ideas. Galileo admitted that he was “wrong” and was forced to abandon his ideas. In the middle of the 17th century. ideas of the evolutionary development of natural phenomena began to penetrate natural science. A major role in this was played by the scientific works of I. Kant, M. V. Lomonosov and P. S. Laplace, who developed hypotheses about the natural formation of the Solar system.

The basic laws of thermodynamics were discovered by S. Karna, Yu. R. Mayer, G. Helmholtz, R. Clausius, Thomson, V. Nerst. One of them - the law of conservation of energy - was accepted as a general scientific law. M. Faraday and D. C. Maxwell founded the theory of the “Electromagnetic field”. Of particular importance for the development of theoretical thinking in biology were the “Cell Theory” of T. Schwann, M. Schleiden, Yu. E. Purkin and the “Evolutionary Theory” of Charles Darwin.

By the end of the 19th century, all natural sciences had developed. In 1861, A. M. Butlerov formulated the doctrine of the “Chemical structure of molecules”, in 1869 D. M. Mendeleev discovered the “Periodic Table of Chemical Elements”, and in the 70s he put forward the hypothesis that “The atom consists of very small particles." In physiology, I.M. Sechenov discovered “Higher nervous activity.” A continuation of this idea was “Conditioned reflexes”, discovered by I. P. Pavlov (1855-1935).

At the beginning of the 20th century, a second revolution took place in physics and natural science in general, i.e. a realistic and quantum mechanical view of the world was recognized. This includes “Electromagnetic waves” discovered by G. Hertz, “X-rays” by Roentgen, “Radioactivity” by M. Becquerel, “The element Radium” by M. Sklodowska and P. Curie, “Pressure of light” by P. K. Lebedev, “ The first theory of quantum theory" by M. Planck and other discoveries /1-6/.

As a result of these discoveries, a historical change in the physical picture of the world occurred. If before Maxwell physical existence was thought of in the form of material points, then physical existence was considered to consist of continuous fields that cannot be explained from the point of view of mechanics. In the 20th century, a new era began, the physical picture of the Universe became a fundamentally new realistic and quantum mechanical picture.

Some concepts of the scientific picture of the Universe include the achievements of science that determine man's place in it. In this case, the scientific picture is not a sum of general knowledge, but an integral system of ideas about the general properties, state and laws of nature. Thus, the scientific picture of the world is a synthesis of various scientific theories and their qualitative generalization, and also represents a separate form of a unique system of knowledge.

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