PHYSICS AS A FUNDAMENTAL SCIENCE

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Abstract. *This work discusses the fundamental sciences and explains in detail that achievements in this area are of great importance in various spheres of humanity and the national economy.*

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It is known that science is both a product of human cultural development (civilization) and a condition for its development. With the help of science, man develops material production, improves relations in society, educates and educates a new generation of human society, and heals his body. The development of natural science knowledge and technology significantly changes the way of life, increases human well-being, and improves people's living conditions.

Due to knowledge of the laws of nature, man can change and adapt things and processes in nature to meet his needs.

Actually, what is the importance of basic sciences.

As an example, let's look at particle physics (also known as high-energy physics), which is considered one of the most fundamental fields of modern physics.

The task of fundamental sciences is to understand the basic principles and laws of nature.

The task of applied science is to solve specific problems related to the material interests of society. As a rule, applied science relies on laws created by fundamental sciences.

First of all, we will consider the significance of fundamental research - how it affects our material life, what it gives to practice.

Simply put, today's fundamental science determines tomorrow's applied science, today's engineering and technology. Thus, fundamental sciences are considered the basis, that is, the foundation for the development of the material and technical sphere.

For clarity, we will limit ourselves to physics.

Historical experience shows that all great discoveries, starting from the time of Galileo and even from the time of Archimedes to the present day, sooner or later led to the emergence of new areas of technology. The "technical problem" can be solved: starting with the great technical innovations, we go back to their origins and see that fundamental scientific discoveries usually occurred in the early days.

Here are some examples.

Faradey's discovery of electromagnetic induction led to the discovery of electrical engineering.

The theoretical research of Maxwell and Gers formed the basis of radio engineering.

Semiconductor electronics and lasers were created thanks to quantum physics.

Drawing on the traditions of scientific research, studies of the atomic nucleus in order to understand the internal structure of matter led to the production of atomic energy.

Practically, this list can be continued as desired.

Here is given one example, seemingly unimportant in our everyday life, but typical. The creation of a navigation system using satellites located at different altitudes from the Earth required taking into account the relations of the theory of relativity to adjust the clocks on satellites moving relative to each other. Scientific and technological revolution of the second half of the 20th century. was carried out at the expense of the fundamental sciences (primarily physics), which developed rapidly in the first half of this century.

It was no coincidence that Alfred Nobel, a chemist, practitioner, entrepreneur and visionary, established a prize for outstanding achievements in the field of basic sciences.

In the fundamental sciences themselves, there is a gradation of the level of "fundamentality" depending on whether the purpose of the research is to establish the basic laws of nature or to explain phenomena on the basis of certain basic laws [1].

W. Weiskopf conventionally calls the first studies "intensive", and the second - "extensive". He cites solid state physics and plasma as examples of "broad" sciences. Today, among the "intensive" sciences, high-energy physics is one of the most advanced (in the 19th century, periods of development of "intensive" sciences were electrodynamics and relativism, quantum atomic theory and nuclear physics, over time they became "extensive" (becoming). High-energy physics - this is the physics of the microworld, a science that studies the smallest "building blocks" of the Universe, the interactions between them, the structure and properties of matter at the subnuclear level. It is known that the simpler the system, the more its properties are determined by general laws, the physics of elementary particles is a global science of. the most general laws and principles of nature. From this point of view, it shows its constant influence on many other natural sciences. In particular, the connection of elementary particle physics with cosmology has made it possible to create a general picture of the origin and evolution of the Universe.

Particle physics has made amazing progress in its short history. It is no coincidence that 1/3 of the Nobel Prizes awarded for the highest discoveries in science over the past half century have been awarded to scientists in this field. Today, particle physics is a science whose many predictions have been confirmed, whose structure is clear and seriously established. This science, both in theory and practice, is rapidly developing in order to understand and reveal the laws of nature that are of the deepest, most mature and comprehensive extent.

As academician L.B. Okun said, "the science of elementary particle physics is a science that explains all the existence around us and determines the level of intellectual maturity of humanity" [2].

In support of the above, we considered it necessary to mention some features of experimental research carried out in the field of elementary particle physics.

Particle physics occupies a special place in modern physics. The reason is primarily that this field is considered the most prominent fundamental branch of physics today, and its goal is to define and create general physical laws. On the other hand, this is due to the peculiarities of its experimental research, the scale and complexity of its base in comparison with other branches of science. We will show these features.

Here we thought about the importance of fundamental research in only one area of physics - particle physics. In today's rapidly developing period of globalization, if we introduce our youth to fundamental research conducted in all fields and involve them in this work, we will contribute to the formation of their scientific worldview and the further development of our country.

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