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PHYSICS AS A FOUNDATION OF NATURAL KNOWLEDGE

Abstract: *In this article, physics is considered as the basis of natural knowledge.*

Keywords: *physics, worldview, natural sciences, thinking, interdisciplinary relations*

ФИЗИКА КАК ФУНДАМЕНТ ЕСТЕСТВОЗНАНИЯ

Аннотация: *В этой статье физика рассматривается как основа естественных знаний.*

Ключевые слова: *физика, мировоззрение, естествознание, мышление, междисциплинарные отношения*

According to the generally accepted opinion, the physicist forms the foundation of natural science. We will try to disclose this thesis by considering the main aspects in which the term "fundamentality" is usually used and try to highlight the main aspects of the fundamentality of physics.The natural sciences are empirical in the sense that their positions are based on a set of empirical data and verified by comparing them. Therefore, for them, statements describing this data are of fundamental importance. In everyday life, reporting a fact is a description of something directly observable. In physics, a reading of experimental facts necessarily implies a set of theories that provide an interpretation of what is directly ascertained. As far back as the end of the 19th century, P. Duhem noted: “A physical experiment is an exact observation of a group of phenomena related to the interpretation of these phenomena. This interpretation replaces the concrete data actually obtained by observation with abstract and symbolic descriptions corresponding to these data, based on theories admitted by the observer”.

This feature characterizes, first of all, and predominantly, a physical experiment (moreover, in any complicated cases the use of appropriate devices is supposed). Most of the observations, both in physics and in other sciences, are "instrumental" in nature, and therefore, not only the awareness of the experimental facts and their relationship with each other suggests an appropriate theory, but a simple description of what is observed is based on theoretical concepts about the devices used, which allows to interpret, for example, a track in the Wilson chamber as a trace of a certain elementary particle.Central to the developed view is the statement of the essentially physical nature of any devices used. Biological, physiological, chemical devices, etc. can not be. Any device used by a scientist is always at its core a physical object and requires the interpretation of physical theories to interpret its evidence. This fact makes the language of physics an integral element of the language of any other natural science discipline and can be called the linguistic (linguistic) fundamental nature of physics.Among the diverse meanings of the word “fundamental” one can distinguish one more aspect related to the relation of physics to empirical data.

As you know, the word fundamental as applied to science, as a rule, means a distinction between theoretical sciences, focused on the disclosure of laws that describe the object being studied, regardless of its practical use. In this sense, it is fair to talk about the fundamental nature of the most diverse scientific concepts in physics, chemistry, biology, geology, etc. in our opinion, it is advisable to introduce the concept of the so-called epistemological fundamentality.

As already noted, the natural sciences rely on empirical evidence. At the first stages of the development of natural science, the so-called inductivity approach dominated the methodology of the natural sciences, according to which the most general provisions of the natural sciences are directly derived from experimental data by direct inductive generalizations. This simplified view is rejected in modern philosophy of science. This circumstance is clearly formulated in A. Einstein's thesis that has essentially become aphorism: "There is no logical path leading from experimental data to theory" according to Einstein's expression, the most important fundamental laws of science are not derived from experimental data, but in the best case, they are only "inspired" by them .Considering now the system of natural science disciplines, it is legitimate to ask the question: are the most important provisions of this discipline derived from any other scientific concepts or is their only justification a reference to experimental data? (as they would say in the eighteenth century, are the provisions of this discipline derived from another discipline or directly derived from experience?).Now in connection with the foregoing, we can introduce the concept of monofundamentality and polyfundamentality.

The thesis of monofundamentalism asserts that there is only one fundamental discipline, the provisions of which cannot be deduced from any other disciplines - they are doomed to a fundamental (in the sense that they cannot be deduced from anywhere) character. The concept of poly-fundamentality presupposes the presence of many fundamental (in the indicated sense) sciences. In the real history of the natural sciences, the fundamental statute was claimed (even better not claimed, but really possessed) physics, chemistry, biology. This means that the basic principles of these sciences were justified by reference to experience and could not be deduced from anywhere. By clearly simplifying the real history of science, we can say that chemistry was the first to lose the fundamental statute. Today, the main features of chemistry are explained on the basis of quantum physics. What was considered in the nineteenth century as a purely specific feature of chemistry (the special force of "chemical affinity", valency, Mendeleev's periodic law) today receives an exact quantum-mechanical substantiation, if any, is derived from quantum physics.

It can be summarized as follows: chemistry lost its fundamental statute (of course, only in the sense indicated here), but acquired a deep theoretical justification. In this sense, we can say that physics is doomed to a fundamental statute. Even if we assume that in the future there will be a certain science, and with which it will be possible to theoretically derive modern physics, then this is a hypothetical science and will be called new physics. It should be noted that the solution to the question of the chemistry statute presented here is controversial, although the objections, in our opinion, are not sufficiently convincing. The situation with the status of biology is clearly more complicated. Today, the fate of biology is becoming similar to the fate of chemistry. In the twentieth century, radical changes in biology took place: the discovery of the double helix of DNA, the creation of molecular genetics, the development of no equilibrium thermodynamics and synergetic - all this allows us not only to talk about the most important life phenomena in the language of a simple description, but to reveal their deep physicochemical basis. Nevertheless, the question of the fundamental nature of biology today cannot be considered resolved at a level comparable to chemistry. Roughly speaking, the recognition of the fundamental nature of biology means the recognition of a special class of biological laws in principle, which can be explained on the basis of physical and chemical laws. In our opinion, the recognition of such (sometimes called biotonic) laws does not seem very likely.

Summing up all the above, we can say that physics has a special fundamental nature, which can be called epistemological. It should be noted, however, that there is one exotic possibility, namely: to recognize the thesis of monofundamentalism and endow such fundamentality not with physics, but with some other discipline. Say, you can insist on one or another version of the organismic concepts and ascribe the monofundamental status of biology. It can be argued that the main features of any sciences can be derived from certain philosophical attitudes. All such constructions are certainly possible, but they are clearly beyond the scope of science.Онтологическая фундаментальность физики (оппозиция редукционизма и антиредукционизма).

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