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The Place and Role of Physics in Scientific and Technical Development

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Abstract
This article is about the importance of physics in the development of society and science and technology and its interrelationship with other disciplines. Provides brief information about the methodology of teaching physics and the importance of using innovative technologies.

Keywords: Revolution, polytechnic education, virtual laboratories, mechanics, quantum physics, nanotechnology, microscopes, robotics.

Introduction

The role of physics in scientific and technical development is very important. The development of physics gave us the opportunity to study unknown phenomena in nature and through them to create technical tools that we use in our daily life. For example, it is not for nothing that the 20th century was called the century of scientific and technical revolution. Because in this century, mankind learned the structure of atoms, nuclei and molecules, the particles that make them up. Earth's satellite was launched and astronauts flew into space and set foot on Earth's only natural satellite, the moon. It can be seen that physics has and will continue to play a key role in the implementation of the scientific and technical revolution. Therefore, teaching physics in connection with the achievements and future of scientific and technical development makes it possible to solve a number of important tasks. In particular, in order to increase the effectiveness of polytechnic education of pupils and students, it is necessary to show that physics forms the theoretical basis of various directions of scientific and technical development. Examples of such areas include mechanization and automation of production, energy, creation of materials with predetermined properties, electronic computing and microprocessor technology. For this, it is necessary to align the polytechnic education of pupils and students with the ideas of the development of the national economy, as well as to harmonize the vocational training.

The effectiveness of teaching physics depends not only on the previous knowledge obtained in physics, but also on the knowledge acquired by students in other natural and social sciences. The interaction of physics with other disciplines allows the implementation of the following didactic tasks.

1. Forming a general scientific outlook on nature in students based on the dialectical unity of natural-scientific knowledge.
2. To achieve systematization of knowledge.
3. To achieve the depth and solidity of their knowledge by forming the skills and competence of the students about the existence of connections between events, theories, and concepts.
4. Facilitating students to solve problems related to various fields during the implementation of polytechnic education, providing them with in-depth knowledge of technological processes.
5. On the basis of the generality of the laws of nature, achieving the strength of students' knowledge and the formation of skills and competences in their ability to apply it in various directions.

It is worth noting that scientific and technical progress, in turn, improves physics teaching. It not only improves teaching tools, but also makes it possible to use them widely in teaching physics. For example, it is possible to show the introduction of computer technology in teaching physics. Nowadays, it is difficult to imagine teaching physics without computer technology, because with its help, it is possible to model phenomena and processes that cannot be realized in laboratory conditions, to study and observe the mechanism of their occurrence through the computer. Also, virtual laboratory programs for school students in physics laboratory classes; Using Phet, Crocadile physics and Yenka electricity and magnetism will help students to learn more about the topic and gain more information about it. This, in turn, shows that the science of physics is closely related to the science of computer science.

Currently, information and its use are necessary for any educated person. This culture is especially important for the reader. It is worth noting that most teachers do not know the computer and do not understand its physical principles. Interdisciplinarity has always played an important role. It is impossible to have deep knowledge within one subject. G. Liebkenecht expressed the following opinion about this: "Knowing one subject does not mean having full true knowledge, in order to have deep knowledge, it is necessary to know that subjects are related to each other." Because all phenomena in nature are inextricably linked, that is, the laws of nature are unique. Accordingly, he should be aware of the connections between physics and computer science courses and their physical foundations. In conclusion, it can be said that interdisciplinary communication provides an opportunity to save time in the educational process. Using the possibilities of EHM in physics lessons during the educational process is an urgent issue today.

It is worth noting that with the help of a scientific and technical tool, it is possible to check the knowledge of students in a short period of time and show the mistakes made. Therefore, in order to clearly imagine the place and role of physics in scientific and technical development, we will carry out this work by epartments.

"Mechanics" appeared as the first independent science in the history of physics, and Galileo and Newton made a great contribution to its creation. We can also say that in ancient times philosophy was the first to unite all sciences, and mechanics was separated as an independent science. As a result, the practical application of mechanics gradually developed, and the machines and mechanisms used by mankind appeared. Later, the technical science "Theory of Machines and Mechanisms" was created, which teaches the theory of the operation of the machine, which is still widely practiced today. Initially, scientists came to the wrong conclusion that all natural

phenomena can be explained on the basis of mechanics. As a result, the "Mechanical View of the Universe" that we now know well was created.

As for quantum physics, this branch of physics occupies a very important place in scientific and technical development. As a proof of this idea, it can be shown that microparticles pass through a potential barrier in quantum mechanics. According to classical physics, if the energy of the particles is less than the height of the barrier, they cannot pass through it, on the contrary, if their energy is greater, they will easily pass through the barrier. In quantum mechanics, the situation is completely different. Although the energy of the particles falling on the barrier is less than the height of the barrier, some of them are free from the barrier! Because oChag, this phenomenon is called "tunnel effect". The Japanese physicist Esaki was the first to realize this effect and created a semiconductor diode. His work in this field was developed, and modern transistors and microcircuits consisting of them appeared. This made a unique development in radio electronics.

Today, thanks to the integration of natural sciences and mainly based on the achievements of physics. nanotechnology is developing very quickly. Therefore, it is necessary to provide necessary information about nanotechnology to future physics teachers. In our opinion, we consider it appropriate to give students the following idea about nanotechnology. It is known that nanotechnology is a technology of manipulation of substances at the level of atoms and molecules in order to obtain products with predetermined composition. The development of nanotechnology was motivated by Richard Feynman's lecture on "There is plenty of space below". In this lecture, the author scientifically proved that from the point of view of physics, there is no objection that anything can be created directly from atoms.

At present, scanning probe microscopes are the main tools of nanotechnology, among which the most common are tunneling and atomic beam microscopes. The main element of the probe microscope! is a superfine needle that scans surfaces at the atomic level. The scanning tunneling microscope is based on the measurement of the tunnel current oscillation that occurs between the probe and the sample surface with a range of less than 0.5 nm. If the distance changes by 0.1 nm, the tunnel current changes 10 times. Such drastic changes make it possible to study the surface structure with high resolution at the atomic level.

The scanning tunneling microscope works in two main modes:

• at a constant height (in this case, the sharp tip moves over the sample, and the current does not change);

• at a constant current (in this case, the current is kept constant due to the displacement of the needle).

Unlike the scanning tunnel, the atomic force microscope allows not only conductors, but also dielectric materials (including bioobjects) to be studied. Atomic force microscopy is based on measuring the intermolecular interaction between the probe and the surface at small distances (on the order of angstroms).

Nanotechnology also makes progress in agriculture. Molecular robots produce food, freeing plants and animals from it. For example, milk production is done without cows, that is, food products are produced directly at home.

Based on the above, introducing future physics teachers to nanotechnologies and their future requires further improvement of the content and methodology of teaching physics in higher schools. It is also necessary to have sufficient knowledge and skills in teaching physics and to

have skills in computer literacy and be able to relate it to physics. Because the 21st century is called the age of computer technologies. Today, many of the things we do and the things we do are connected to the devices and mechanisms we use every day. In addition, the most developing field today is the field of robotics, because the role of physics is very important in the principle of its operation, that is, in the construction of devices.

REFERENCES

1. M. Djoraev "Methodology of teaching physics", Tashkent-2013.
2. O.Q. Kuvondikov "Methodology of using innovative technologies in teaching physics", SamSU publication, 2021.
3. M. Djorayev, B. Sattarova "Physics and astronomy teaching theory and methodology", Tashkent-2015.
4. M. B. Dusmuratov "Physics" was published by TDPU printing house, 2016.
5. M. Usmanov "Physics", "Yosh kuch", Tashkent-2021.