

THE IMPROVED CONTECT OF THE SECTION, PHYSICS OF ELEMENTARY PARTICLES AT THE BACHELOR DEGREE OF HIGHER EDUCATION

Davletniyazov Salamat Paluaniyazovich

Assistant of Nukus State Pedagogical Institute Named After Ajiniyaz, Uzbekistan

s.davletniyazov@adpi.uz

Eshbaeva Malika Maxsetbaevna

Assistant of Nukus State Pedagogical Institute Named After Ajiniyaz, Uzbekistan

ANNOTATION

This article is about the development of an improved content of the section " Physics of Elementary Particles " at the becholor degree of higher education, thereby increasing the effectiveness of teaching.

Keywords : physics of elementary particle, symmetries and conservation laws based on them , black matter , black energy , gravitational waves.

INTRODUCTION

It is known that the last stage of reforming the education system in the country is being carried out. At this stage, all the factors that can be the basis for the training of highly qualified, competitive professionals - the subjects taught, their programs must be improved. It is important to remember that physics is one of the main factors in the development of society. [1] The achievements and results of elementary particle physics, the youngest branch of physics, are universal, and many of them were awarded the Nobel Prize in 2004, 2005, and 2008. is proof of our opinion that he won the award. Unfortunately, the processes in the world of elements, their interactions, their interactions, and the laws of symmetry and conservation are not sufficiently studied in higher education. We know that each branch of physics reveals the processes, events, and laws that govern it, so that the student's knowledge and ideas about the field and the independent thinking based on them are fully formed. For example, Rutherford's experiment in atomic physics, Bor topics such as postulates, Frank-Gers, Davisson-Jermer and Stern-Gerlach experiments, de Broglie's idea, spectra of hydrogen atom radiation, Moselle's law, combinatorial principle, Compton effect, direct the reader directly into the world of nuclear phenomena. serves the formation of imagination and knowledge. In this sense, the above topics will never lose their value.

MAIN PART

Now, as for direct particle physics, this field exists in the form of atomic nuclei and elementary particle physics, in which not enough attention is paid to particle physics. However, it should be noted that worldwide, particle physics is studied as a separate science. This is because the properties of particles are characterized by 11-dimensional spatial properties, according to the current level of development of the field. Four of these are three-dimensional space and time as we know them, and the remaining seven dimensions apply only to internal (hidden) spaces related to particle physics. In addition, these internal spaces are stored quantities based on the

properties of symmetry - quantum numbers behave differently in four fundamental - strong, electromagnetic weak and gravitational interactions, ie in some interactions they are preserved, in others they are distorted, etc. [2]. In general, in order to humanize the physics of elementary particles, as in other branches of physics, the content of its teaching is different from the specifics of the field, the basic laws, the nature of the processes. As in the case of the sections, it is necessary to organize it in terms of topics and systems that help to give an in-depth understanding of the field. In this sense, it is also advisable to organize a 50-60 hour separate elementary particle physics course for the bachelor's degree. It would be useful to explain the basis of this course through symmetries and the laws of conservation based on them, that is, the need to introduce into science the quantities that are stored - quantum numbers (for example, isospin, curiosity, charm, etc.). Because these unnecessarily perceived magnitudes and terms seem artificial to the reader. Observing and analyzing how symmetries and quantum numbers in the world of particles behave in different fundamental interactions - the preservation or destruction of particles in different interactions (by solving problems in practice) has undoubtedly strengthened the theoretical knowledge. were. It would be useful to devote another part of this course to practical training, and in these classes students should be able to freely express their knowledge acquired in theoretical training and participate in debates [3]. In this way, students would have their own ideas and solid knowledge of elementary particle physics, as in other branches of physics. This is in their elementary particle physics It would serve as a basis for the study of many new directions in recent years, such as black matter, black energy, gravitational waves, neutrino oscillations, and at the same time to reach the level of world development in the field of particle physics. To this end, in the process of working on the above topic, the symmetries in elementary particle physics and the conservation laws arising from them were explained in depth to the students in order to achieve a full level of thinking based on these conservation laws [4]. In particular, a great deal of attention to conservation laws, such as the spatial pair, the combinatorial pair, would allow us to show the uniqueness of the particle world.

MATERIAL METHOD

We can offer the content the section „ Elementary particle physics “ as follows (1,2 – table) . The program covers 7 topics and aims to provide a future physics teacher with a complete and systematic knowledge of elementary particle physics. The content of each topic covers the modern traditions of the development of elementary particle physics.

Table 1. Atomic, Nuclear and Elementary Particle Physics The program of the course "Elementary Particle Physics"

№	Theme	Hours			
		report	Problem solving	Independent work	all
1	History and concepts of particle physics	2			4
2	Types of interactions .Particle classification	2	4		6
3	Elementary particle characteristics	4	4		10
4	Symmetries and storage times	2	4		10
5	Class of strange particles, properties	2	2		4
6	Class of charming particles . Properties	2	2		4
7	Characteristics of quarks , gulls	4			6
	All	18	16		44

Table – 2. Problem solving topics

No	Theme	Hours
1	Problems with baryon , lepton charges	4
2	Issues related to conservation laws	4
3	Issues related to couples	4
4	Issues with strange particles	2
5	Issues related to charming particles	2
	All	16

At present, modern pedagogical technologies are used in the organization of the educational process, which helps to activate this process [5]. Among these, we recommend focusing on electronic, interactive, and group-based learning technology [6].

The learning process is based on a set of interrelated topics that are guided by the teacher based on the principle of proportional feedback. Each topic is designed according to the content of the subject "Elementary Particle Physics" and has a linear structure. Depending on the internal form of the course "Elementary Particle Physics" has the following components:

- Lectures
 - Practical Exercises,
 - Consultations (individually and in groups, in the classroom and outside the classroom, IT)
 - Diagnosis and evaluation of knowledge in the classroom (written or computer-based tests, group discussions),
 - Generalization lesson (for example, a mini-conference or game at the end of the course). The general scheme of independent work of students includes two types of activities:
 - Extracurricular independent work (analysis of information on a given topic, for example, theoretical material, statistics, preparation for practical training, performance of individual tasks, preparation of answers to control questions);
 - Independent work in the classroom (control work, solving tests, participation in discussions).
- As teaching methods, we recommend the use of individual, interactive and e-learning methods, divided into groups (brainstorming, spinning, group project, games, etc.), in pairs (writing letters, reviews between "scientists").

CONCLUSION

The provision of the training course with the technical means of teaching will be possible only if it fulfills its didactic tasks, to achieve the goal of mastering, to increase the effectiveness of teaching.

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