American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 10 Pages: 11-17
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

Journal Website: https://theusajournals.com/index.php/ajast

Research Article

PHYSICS AND ITS RELATIONSHIP WITH OTHER SCIENCES

Submission Date: October 01, 2022, Accepted Date: October 05, 2022,
Published Date: October 11, 2022
Crossref doi: https://doi.org/10.37547/ajast/Volume02Issue10-03

Oltinoy Kodirova
Teacher Republican Specialized Design School

ABSTRACT

This article discusses the physics and its connection with other sciences. The main task of modern physics is to comprehensively study the material world, to find the laws of its structure and motion, and to connect these laws to each other. Motion is the main property of matter and the condition of its existence. The form of movement of matter is divided into several main types: mechanical, physical, biological and social. There was an opportunity to separate disciplines based on the study of the type of movement.

KEYWORDS

Physics, connection, modern physics, material world, structure, motion, main property, condition existence, opportunity, type of movement, semiconductor physics, biophysics, solid state physics, heliophysics, conditional boundaries.

INTRODUCTION

Physics is one of the main natural sciences that study the laws of inanimate nature. It is very difficult to determine the scope of phenomena studied in physics or the conditional boundaries of this science. Later, new branches of physics such as plasma physics, elementary particle physics, semiconductor physics, biophysics, solid state physics, and heliophysics are intensively developing.

The discovery and research of new branches of physics leads to the emergence of new branches of

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 10 Pages: 11-17
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

technology. The development of technical sciences, in turn, helps to improve research methods in physics: for example, it was possible to create powerful accelerators of charged particles only because of the high level of technology.

Physics means "nature" in Greek. Physics is one of the most ancient sciences, which studies the structure of matter, types of motion, energy and interactions of bodies, and determines the general laws of natural phenomena that all natural sciences use. In ancient times, physics was considered a science that studied all the phenomena of nature in the full sense. Only after the expansion and deepening of humanity's awareness of the surrounding world, it was separated as separate parts of physics (geology, zoology, botany, chemistry, astronomy, etc.) as independent natural sciences.

The main task of modern physics is to comprehensively study the material world, to find the laws of its structure and motion, and to connect these laws to each other.

THE MAIN FINDINGS AND RESULTS

Motion is the main property of matter and the condition of its existence. The form of movement of matter is divided into several main types: mechanical, physical, biological and social. There was an opportunity to separate disciplines based on the study of the type of movement.

Hence, physics can be called a science that studies mechanics and physical movement. The physical form of motion can be divided into molecular-kinetic (thermal), electromagnetic, atomic, nuclear motion. Therefore, physics is studied in the form of the above sections. The types of motion of matter are closely related. This connection gives rise to new disciplines. Physics gave birth to such subjects as resistance of materials, thermal engineering, and electronics.

Studying the history of physics is an integral part of general physical knowledge. Because by studying the science of physics, its history is also being studied. In order to know the history of physics, it is important to study the original meaning of these laws, to study the writing of these laws.

Knowledge of the world is not formed at once, for example: Newton's laws were studied for thousands of years, and it took 250 years to understand it. Humanity has to go through a very difficult path to get from ignorance to knowledge. In order to study science, we need to know its history - that is why the history of physics is studied. Because this history is continuous, and because it left its mark in the development of the science of every past period, the history of physics is considered as a subject.

The main task of any science is to discover laws, these laws develop this field. The main task of the history of science is to guide the development of science based on these laws. At first glance, this seems like a no-brainer, because no science can tell in advance when Archimedes, Beruni, Newton, Lobachevsky will be born, but discoveries in any field, their study and improvement, certainly play an important role in bringing new scientists to life. So, every science has its own history. Every discovery is a continuation of a previous discovery. Science is a product of complex and subtle human activity. The history of the development of science is related to formations.

The need to develop physics, like all other sciences, comes from the practical demands of society. These requirements lead to the development of production during the development of physics, and increase the material well-being of society during the development

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 10 Pages: 11-17
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

of production. Therefore, as the development of science leads development, development always puts pressure on the discovery of new laws of physics.

Astronomy is one of the main reasons for the development of natural sciences. The development of mathematics was necessary for the development of astronomy. The construction of instruments for astronomical observations led to the development of mechanical laws. For example, the need to use levers to build towers, high mosques, and pyramids gave birth to the science of construction mechanics. All of this leads directly to the interconnection of arithmetic, geometry, algebra, astronomy, mechanics and other sciences. For example, learning mathematics based on Egyptian and Babylonian mathematics introduced the concept of fundamental number and it was used in geometric calculations. The directions of the Sun and the Moon were calculated.

Physics is not only related to production, it is also related to all natural sciences. We will see this in our study of the history of science.

Physico-experimental science, that is, any theory, regardless of how it appears, is proven in experience. One of the main features of physics is that its laws have quantitative properties, that is, any physical law provides a connection between physical quantities. Therefore, measurements are based on physical experience. Connections between existing physical quantities and laws can only be made with the help of measurements.

It can be said that the success of physics depends on the improvement of measurement techniques. As a result of this, the fundamental theories of today appeared (the theory of relativity, quantum mechanics). An increase in experimental accuracy leads to the improvement of experimental techniques, resulting in the emergence of new physical theories. But the new theories do not completely negate the old theories, but only expand their scope of application. For example, the improvement of optical instruments and the increase in the accuracy of measurements led to the emergence of Einstein's theory of relativity. But this did not disprove Newton's theory, but showed that it cannot be supported at speeds close to the speed of light.

Another aspect of physical research is the use of "models" that represent matter, not matter itself, in theories of solving concrete problems, for example, a material point, a mathematical pendulum, an absolute black body, and so on uses. After that comes the solution of specific issues.

One of the multifaceted aspects of physics is its connection with human sciences. These links are as follows:

a) Regardless of the complexity of various processes in the human body, it is possible to distinguish among them those close to physical processes. For example, circulation-fluid flow (hydrodynamics), dispersion of elastic vibrations in the body (oscillations and waves), mechanical work of the heart (mechanics), generation of biopotentials (electricity), etc. Breathing depends on gas movement (aerodynamics), heat transfer (thermodynamics), evaporation (phase transitions, etc.).

b) Physical tools are used in the study of the human body. Here are some examples:

a) It is used to evaluate the mechanical size-mining pressure-the state of the human body.

b) Hearing sounds provides information about the functioning of internal organs.

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 10 Pages: 11-17
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

c) A thermometer is a widespread diagnostic tool based on the thermal expansion of mercury.

d) Cardiography method of recording biopotentials occurring in a living organism.

e) For microscopic biological studies...

f) Fiber optics-based instruments-for viscera and mineless surgery...

g) Spectral analysis - in forensics, medicine, hygiene, pharmacology, biology...

h) Achievements of atomic and nuclear physics are used in x-ray diagnostics.

The properties of the environment have a great influence on the human condition. The well-being of a living organism depends on its interaction with the environment. It is known that the human body quickly feels the effects of physical variables such as temperature, humidity, and air pressure.

From the above, it became clear that man is the main factor in the study of physics. He/she lives in a universe defined by the laws of physics. The emergence of a person, his current and subsequent activities depend on environmental changes. The development of human characteristics is determined by physical conditions and laws in the Universe. The following follows from this: First, a person moves like other natural bodies, participates in interactions, is influenced by various fields. Second, a person is a complex physical system connected to the environment. Thirdly, a person is a factor that implements subjects of knowledge such as observation, measurement, experience, hypothesis, theory. Fourthly, man uses the environment to satisfy his ecstasy by observing the achievements of physics.

The world around us can be characterized by various quantities: linear size, time, mass, density, speed, etc. We will get to know many of them while studying the physics course.

a) One of the main quantities is the linear dimension. A linear unit of measurement is 1 meter. At present, 1 meter is taken as a length equal to 16507663, 73 wavelengths of Krypton-86 atom transition radiation to 2R10 and 5d5 levels. The old platinum-iridium standard of the meter is kept in the city of Sèvres (France).

b) Another one of the main physical quantities is time. Time is closely related to space and is one of the general forms of matter. In this case, matter is the form of existence of the material world and processes, and time is the form of the exchange of phenomena and the state of matter. Space and time have quantitative and qualitative continuity. The universal characteristic of time is its duration, non-repetition, non-return. The unit of time is 1 second. 1 sec. 9192631770 period between two ultra-thin levels in the radiation of cesium isotope with atomic weight equal to 133.

Kinematics studies the motion of bodies and does not consider the causes of this motion. The movement of a body consists of the sum of the movements of its parts and points. Therefore, first the state of the point is determined, and then its movement is studied. Thus, in the department of kinematics, the motion of a macroscopic body can be studied in the same way as the motion of a material point. In this case, the size of the macroscopic object should be many times smaller than the distance it has traveled.

Dynamics is a branch of mechanics that studies the causes of motion of bodies. Therefore, in this section, special attention is paid to the choice of the number system.

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 10 Pages: 11-17
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

In order to describe motion in kinematics, we did not associate the quantities representing it with the number system. Objects moving relative to each other can be taken as reference bodies associated with the coordinate system. In dynamics, it is necessary to choose the inertial reference system connected with the coordinate system. In the inertial frame of reference, a material point can move freely relative to it with constant velocity. In this, the material point must not be affected by body for it to be free. It is well known that other reference systems moving with constant speed relative to the chosen inertial reference system are also inertial. To choose an inertial reference system, it is necessary to take a reference body that is not affected by other bodies. Such a body is called free, the coordinate system attached to the ground can be considered inertial. But for long-term motion, the coordinate system is not exactly inertial. For example, the plane of oscillation of the pendulum must not change relative to the inertial frame of reference, but its plane of oscillation is deflected relative to the earth's surface over time, and the flying projectile also deviates from the target and etc. Because the earth revolves around the Sun. Therefore, the inertial reference frame connected to the earth is also approximately inertial. The inertial reference system associated with the sun can be said to be accurate. But this system is not clearly inertial, because the Sun is also affected by other celestial bodies (stars, planets, etc.). Thus, the inertial reference system is abstract. But we can laugh at them with some precision. There are such inertial reference systems relative to which a free material point moves flat and in a straight line - this is the essence of the law of inertia. But it is defined differently. The law of inertia was first discovered by Galileo (1561-1642) for horizontal motion: "If a body moves in a horizontal plane and this plane is increased infinitely, such a body will move in a straight and constant motion". The exact definition of the law of inertia was given by Descartes and later by Newton. Newton's law of inertia is defined as his first law: "Unless a body is acted upon by another body, that body remains at rest or continues to move in a straight line".

The disadvantage of Newton's above definition is that inertial reference systems are not mentioned. Instead, he introduced the concept of absolute space. As a result, it became clear that the concept of absolute space has no meaning. Thus, Newton's first law is defined as follows: there are such inertial frames of reference that if a body is not affected by another body or if their effects are mutually compensated, such a body remains at rest or continues to move in a straight line.

If the velocity of a material point changes in the chosen inertial reference frame, it is said to be acted upon by other forces. A change in velocity is an acceleration. Experiments show that the magnitude of the acceleration depends on two conditions:

The size of the influence of the surrounding bodies on the object under investigation;

1) To the quantities determining the properties of the body.

A physical vector quantity describing the deformation or acceleration of a body as a result of the impact of one body on another body is called force. The force can be of different physical nature, for example, the force of elasticity, the force of gravity, the force acting on a charged particle in an electric field, and etc. All forces change the velocity of an object, and this change depends on the magnitude and direction of the force, not on the nature of the force. Force changes velocity in both magnitude and direction, so since velocity is a vector quantity, force is also a vector quantity.

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 10 Pages: 11-17
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

Therefore, the effect of several forces acting on the body is determined by adding vectors.

To determine the numerical value of the force, the quantity used as its unit of measurement is chosen. For example, a spring stretched to a specific length can be taken as a measurement. We can say that if this force is affected by a force equal in number and opposite in direction, their total effect will be zero. The instrument used to measure force is called a dynamometer. This tool is based on the force generated by the spring being stretched.

The acceleration obtained by the body depends on its properties. One of these properties is inertia. A measure of inertia is mass, which is a scalar quantity. In classical mechanics, mass is a quantity that describes a body and does not depend on the state of the body, that is, it does not depend on whether the body is in motion or at rest. In mechanics, mass does not depend on the interaction of a body with other bodies. This property of mass was introduced by Newton, and its size determines the amount of matter in the body.

After Newton, other scientists understood mass as a quantity of matter. The development of science has led to serious contradictions in these concepts. According to the theory of relativity, mass depends on its velocity and energy without being a fixed quantity. With an increase in temperature, the mass of the body increases, although it is very small. It follows that the concept of "amount of matter" has no physical meaning. As we have already said, mass is a scalar quantity, and in classical mechanics it consists of the sum of the masses of particles. This feature makes it possible to measure mass. The unit of mass is 1 kg, which is the mass of a platinum-iridium alloy stored in the city of Sèvres near Paris. When we measure the mass of an object on a balance scale, we know that the weight exerts the same acceleration on the balance stone and the object. Balance circuits tend to get the same acceleration, resulting in equilibrium.

CONCLUSION

In recent years, a lot of new information about renewable energy sources (wind, solar, geothermal, biomass) has been published in the mass media and at scientific and practical conferences. Therefore, it is necessary to apply this information to the educational process, in particular, to physics classes, to convey to students the latest modern physical and technological foundations of energy, energy, and to have sufficient knowledge, skills and qualifications in this field. In such a time, when attention is paid to science and teachers, we teachers are required to look at the new era in a new way, approach and penetrate the minds and hearts of students with technologies, so we should take steps with this high goal.

REFERENCES

1. Avezov, R. R., Avezova, N. R., Matchanov, N. A., Suleimanov, S. I., & Abdukadirova, R. D. (2012). History and state of solar engineering in Uzbekistan. Applied Solar Energy, 48(1), 14.
2. Toirov, O., Kamalov, T., Mirkhonov, U., Urokov, S., & Jumaeva, D. (2021). The mathematical model and a block diagram of a synchronous motor compressor unit with a system of automatic control of the excitation. In E3S Web of Conferences (Vol. 288, p. 01083). EDP Sciences.
3. KOZIMOVA, Z. (2022). CONCEPTS OF SPECTACLE ART THAT EXISTED IN THE XIV-XV CENTURIES. EPRA International Journal of Research and Development (IJRD), 7(4), 88-92.
4. Dosimbaev, A., Karabaev, K., & Khalikov, U. (2004). Nuclear material control and

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 10 Pages: 11-17
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

accounting at the Institute of Nuclear Physics of the Academy Sciences of Uzbekistan.

5. Toirov, O., Urokov, S., Mirkhonov, U., Afrisal, H., & Jumaeva, D. (2021). Experimental study of the control of operating modes of a plate feeder based on the frequency-controlled electric drive. In E3S Web of Conferences (Vol. 288). EDP Sciences.
6. KOZIMOVA, Z. (2022). THE USE OF CONCEPTS IN THE ART OF SPECTACLE IN THE WORK" BOBURNOMA". EPRA International Journal of Research and Development (IJRD), 7(3), 77-79.
7. Jumaeva, D., Toirov, O., Akhmedov, N. R. R., & Eshmetov, I. (2021). Energy of adsorption of polar molecules on NaLSX zeolite. In E3S Web of Conferences (Vol. 288, p. 01041). EDP Sciences.
8. Dosimbaev, A. A., Baytelesov, S. A., Koblik, Y. N., Salikhbaev, U. S., Khalikov, U. A., & Yuldashev, B. S. (2006). Fuel assemblies of low enriched U-235 in reactor of Institute of Nuclear Physics of Uzbekistan Academy of Sciences.
9. Jumaeva, D., Abdurakhimov, A., Abdurakhimov, K., Rakhmatullaeva, N., & Toirov, O. (2021). Energy of adsorption of an adsorbent in solving environmental problems. In E3S Web of Conferences (Vol. 288). EDP Sciences.
10. KOZIMOVA, Z., & ABDUJABBOROVA, X. (2022). THE USE OF PERFORMING ARTS TERMS IN CLASSICS (ON THE EXAMPLE OF ALISHER NAVOI'S WORKS). EPRA International Journal of Multidisciplinary Research (IJMR), 8(3), 8-11.
11. Yuldashev, B. S., Salikbaev, U. S., Baytelesov, S. A., Dosimbaev, A. A., & Khalikov, U. A. (2007). Account and Control of Nuclear Materials at the WWR-SM Reactor in the Institute of Nuclear Physics, Tashkent. In Safety Related Issues of Spent Nuclear Fuel Storage (pp. 143-146). Springer, Dordrecht.
12. KOZIMOVA, Z. (2022). THE USE OF CONCEPTS IN THE ART OF SPECTACLE IN THE WORK. EPRA International Journal of Research & Development (IJRD), 7(3), 1-1.