THE PHYSICS OF TRUTH

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ABSTRACT

Physics is the oldest branch of science in human history. With many fields of study, from astrophysics to nuclear physics, physics has a significant impact on the development of technology and industry. Physics is often described as a difficult branch of science to understand. Therefore, this article aims to explain some information about different fields of physics by finding similarities between phenomena and situations encountered in everyday life, thereby making physics more interesting and understandable.

Keywords: *Physics, everyday life, physics without formulas*

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Physics is the branch of science that studies how the universe works from the microscopic to the macroscopic scale through quantities such as matter, force, energy, and frequency. Physics, one of the major natural sciences, can generally be examined in three main areas; classical physics. The main subjects of classical physics are; classical mechanics, optics, electromagnetism, fluid mechanics and thermodynamics.

Subjects such as atomic theory, condensed matter physics, nuclear physics, particle physics, and quantum field theory are among the disciplines of quantum physics. Relativity can be tested in two ways: general and special relativity. In this study, the similarities of various information in many fields of physics with events or situations encountered in everyday life are tried to be expressed only with numbers and definitions without using formulas. Thus, this article, which tries to make various information about physics more interesting, understandable and memorable, also allows you to look at physics from a different perspective.

Some expressions used in everyday life and their equivalents in physics

In this section, we will try to explain expressions that are used in everyday life events, some emotions we feel, thoughts that pass through our mind, or by finding their alternatives in physics.

Pursuit on the Run: The phrase "pursuit on the run" refers to the attraction and desire for people who are hard to communicate with and reach , and has its equivalent in physics in Lenz's law of magnetism. It is known that magnets create magnetic fields. When bringing a magnet closer to a conducting ring, the magnetic field lines begin to pass through the closed area surrounded by the ring. The number of magnetic field lines (magnetic flux) passing through this closed area increases and decreases accordingly as the magnet approaches and moves away from the ring. Due to this time variation of the magnetic flux due to the movement of the magnet, a current is created in the loop. In the first case, when the magnet is brought closer to the ring, the magnetic field lines in the ring are strengthened and a current is created in the ring (induction). The magnetic field created by this current is in the opposite direction to the field created by the magnet and pulls the magnet away from itself. When the magnet is removed from the loop, the value of the magnetic flux in the loop decreases with time. In this case, the direction of the current changes and the direction of the magnetic field created by the current also changes.

Visible portion of an iceberg: It is well known that a certain portion of the ice that remains in the water remains above the water. This is because the density of ice is less than that of water. By comparing the density of ice and water, the volume of ice under water can be found. This indicator is about 89%. In other words, about 11% of the ice is above water. The invisible part of the ice, that is, under water, is 89% larger. The expression "the tip of the iceberg", which is also used in everyday life, is also scientifically correct.

Soaring: The phrase "not touching the ground," meaning to be very happy, may find its equivalent in superconductors. Conductors; They are systems that exhibit extraordinary quantum mechanical properties such as quantum gravity and quantum entanglement. A material that can be a conductor has zero electrical resistance below a certain critical transition temperature. Superconducting materials capable of excluding an applied external magnetic field remain suspended in air when placed in a magnet. This property of conductors, which exhibits some of the most unusual behavior related to conduction, can be the physics equivalent of the phrase "flying in the air" in everyday life.

Stop Time: The concept of time is defined as the period during which a time, task or event occurs, passes or passes. Although the quantity of time in classical physics and quantum physics has different properties, in both cases the largest indicator of the passage and passage of time is the change in the system or phenomena. If there is no change in the system under consideration, the concept of time has no meaning, and the system concerned continues to exist as if time had stopped. In superconductors, the quantity that preserves all the properties of the system and can replace time is temperature. If the material is kept in a temperature range where it can remain superconducting, and there are no other effects of the external environment that change the temperature, none of the properties of the material will change. In short, the phrase "time stands still" is used in physics to mean that nothing changes or changes. In this case, temperature is the same as the concept of time.

Nothing can be created from nothing: The concept of "cannot be created from nothing", which is widely used in everyday life, manifests itself in the laws of conservation in physics. Conservation laws are principles in physics that state that a certain physical property, a measurable quantity, does not change with time within an isolated physical system. In classical physics, we encounter the laws of conservation of energy, momentum, mass, and electric charge. In its simplest form, the principle of conservation of energy can be described as follows: The energy of any system in its initial state is equal to the energy after its state or velocity has changed. If a frictional force acts on the system, part of the energy is converted into heat energy. But in any case, energy balance is achieved. In short, the initial state energy of a system is always equal to its final state energy. In other words, energy cannot be created or destroyed, it can only be transformed into another form.

Equitable distribution: The expression for equal distribution can be explained by the law of conservation of charge. According to this law, the total charge of two charged conducting spheres before they touch is equal to the total charge after they touch. In the latter case, whichever area has a larger radius will have more load. In this case, a sphere of radius 2R has a charge of 2Q, while a sphere of radius R has a charge of Q, as shown in Figure 3. In other words, the total load is distributed proportionally to the dimensions of the spheres.

Creating each other: Maxwell's equations describe how electric and magnetic fields are related to each other. Maxwell's equations state that electric and magnetic fields do not always need a medium for them to occur. To briefly explain; A change in electric field over time creates a magnetic field, and a change in magnetic field over time creates an electric field. In other words, a decrease in the magnetic field over time leads to an increase in the electric field. The opposite is also true. It is known that time-varying electric and magnetic fields create electromagnetic fields, and therefore electromagnetic waves can travel through space without the need for a medium. If these fields did not form each other, the Sun's rays could not reach the Earth and life would not exist on the planet.

Always found in pairs: There are some quantities in nature which always exist in pairs. The first example of this situation is magnetic poles. A magnet always has magnetic north and south poles. As shown in Figure 4, even if the bar magnet is divided into small pieces, it retains this property and only the intensity of the attraction of the poles decreases. In short, a single isolated magnetic pole has yet to be identified in nature. The other quantity in the couple is the action-reaction forces. For example, when we sit on a chair, there is a downward force acting on the chair due to our weight. In the opposite direction, there will be a reaction force applied by the chair with an intensity equal to our weight. When these two forces are in balance, you can sit comfortably in a chair. Otherwise, if the impact force is greater than the reaction force, the chair will break and the person sitting on the chair will fall. Therefore, to satisfy the equilibrium condition, the action and reaction forces are always paired and equal to each other.

Sudden change: There are many situations in physics where sudden change is found. An example of this is the Curie temperature, the critical temperature at which a ferromagnetic substance loses its permanent magnetism and becomes paramagnetic. In the case of conductors, a material that is an insulator at room temperature suddenly becomes a superconductor when the temperature drops to a critical transition temperature. Another example is the change in water conditions. At a temperature of 374.14 oC and 22.09 MPa, water suddenly changes from a liquid phase to an invisible gas phase, which is called the critical point. In short, dramatic changes can be observed in all systems when the necessary conditions are met.

Advantages of Motion: The subject of motion finds many areas of study in physics. One of the most important is the role of movement in the production of electricity. If a loop or frame of conducting wire is placed between the poles of the magnet and rotated, an alternating current generator is obtained, as shown in Figure 5. But when the movement stops, the system can no longer generate electricity.

It has potential but does not move : Potential energy is a type of energy that can be stored in a system and converted into kinetic energy due to its location and position. For example, if an object is located at a high place, it has the potential energy of the height, while a compressed or stretched spring has elastic potential energy. An object falling from a height begins to fall and accelerates. In this case, the potential energy of the height is converted into kinetic energy due to the speed of the body. When an object is placed in front of the compressed spring and released, the object regains momentum. In short, both potential energies can be converted into kinetic energy when the necessary conditions are met. The same goes for people. Everyone can always have potential energy to act, but the most important thing is to make a decision that activates it. Just because it stops doesn't mean it doesn't work. The ball at the head rises from its equilibrium position and hits the next ball when released. Thus, the potential energy of the height is converted into kinetic energy, i.e. speed, and transfers momentum (increasing mass and speed) to the first ball next to it. Even though the 3 balls in between do not move, it transfers the momentum to the last ball. The last ball rises quickly with a given impulse. If there are no balls touching each other, there is no transfer of momentum to the last ball and the last ball cannot move. In short, we must not forget that sometimes things that don't work or seem insignificant can be key elements necessary for the system to continue.

Are the things we call normal not normal?: More than 95% of the universe we live in is made up of dark matter and dark energy, which means the unknown. The remaining less than 5% consists of known or so-called common substances. At this point, the following thought may come to mind: "Why is less than 5% of the universe called ordinary matter?". In everyday life, one should not forget that the fact that the majority or minority in the system can be normal can change according to the existing situation and conditions.

Just because you can't see it doesn't mean it doesn't exist: The visible region is the part of the electromagnetic spectrum that corresponds to wavelengths between about 400-800 nm (nanometers, 1x10-9 m). In the visible region, the rays with the longest wavelength are red, and the shortest wavelength is violet. The rest of the spectrum, from radio waves to gamma rays, is invisible. Some properties and areas of use of the electromagnetic spectrum are given. Wavelengths can range from hundreds of kilometers to sub-nanometer sizes. In short, only a very small part of the spectrum can be seen by the human eye. Some regions of the spectrum, such as the infrared region, can only be detected by devices such as thermal cameras. In short, there is no such thing as invisible things. Through this example, it can be understood that the concept of truth is a very broad concept that cannot always be determined by the five senses.

Two in one: Wave-particle duality means that physical entities (such as light and electrons) have both wave-like and particle-like properties. Based on experimental evidence, the German physicist Albert Einstein first showed that light, considered a form of electromagnetic waves, should also be considered as particle-like structures localized in discrete packets of energy. The most famous example on this topic is X-rays obtained with X-rays. X-rays are located in the region of the electromagnetic spectrum with the smallest wavelength, after gamma rays, in the nanometer range. Since the wavelength is small, the particle properties of X-rays dominate and their interaction with matter is enhanced. Therefore, cracks in the bones can be seen thanks to X-rays. As the wavelength increases, the wave character begins to dominate. In short, a change in one of the quantities of the system can cause the corresponding system to have very different properties.

Conclusions and recommendations

It is important to relate information about different research areas of physics to known, simple phenomena so that they are easily understood and remembered. For this reason, in this study, an attempt was made to explain some facts about physics, from Lenz's law to wave packets, by analogy with everyday life. In this way, it becomes easier to conceptually understand the relevant topics and then it becomes easier for teachers to elaborate them with formulas and graphs.

There may be other ways to make physics lessons understandable and therefore interesting. For example; Students can be given a variety of information about the lives of scientists such as Albert Einstein, Max Planck, Isaac Newton and Marie Curie . It is recommended to watch films about the life stories of scientists. Science fiction films are sure to appeal to many. In this context, the teacher chooses a science fiction film, after watching the film, the accuracy of the story or information in the film can be discussed from the point of view of physics. Philosophy of physics can be another way to develop an interest in physics. Philosophical examination of concepts such as time, space, and energy also make physics interesting for students. It should not be forgotten that physics is a part of life, a field of science that tries to show the reality to humanity in all its details and is constantly developing with new information. Therefore, by using the various methods mentioned or suggested in this study, it is possible to instill interest and love for physics in students.

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