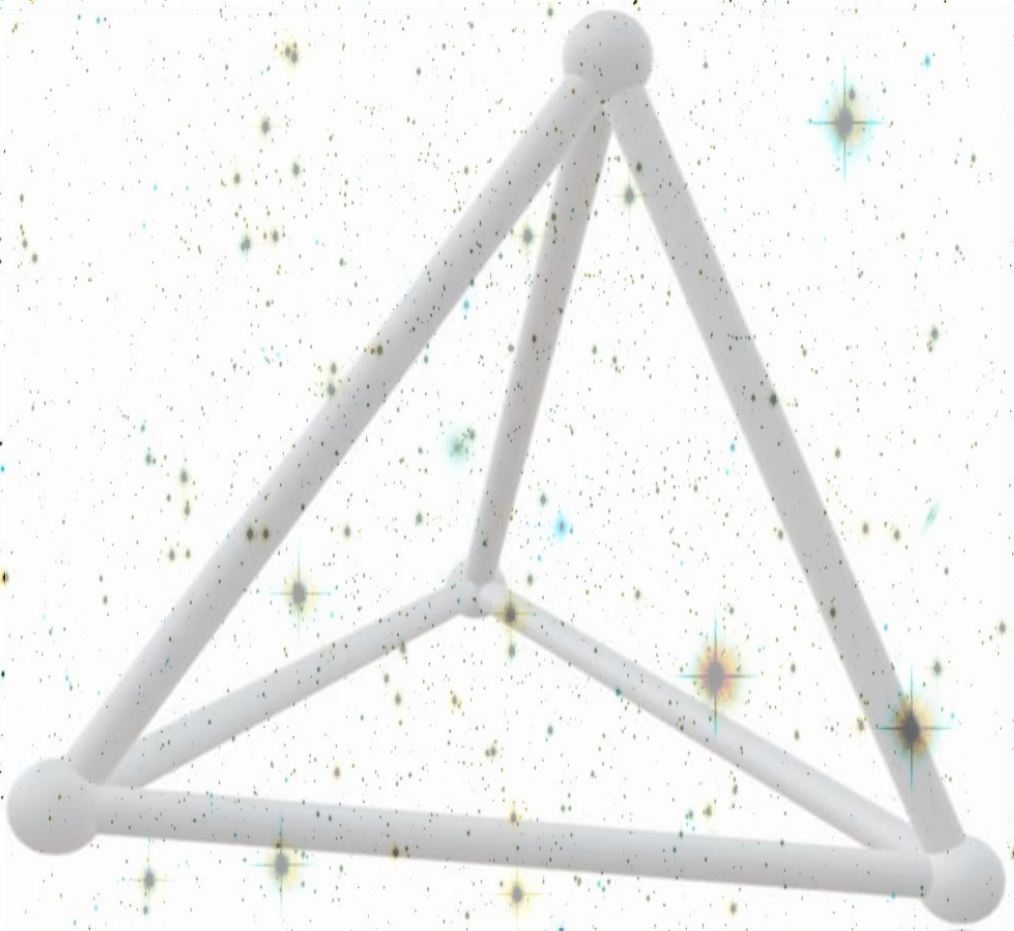
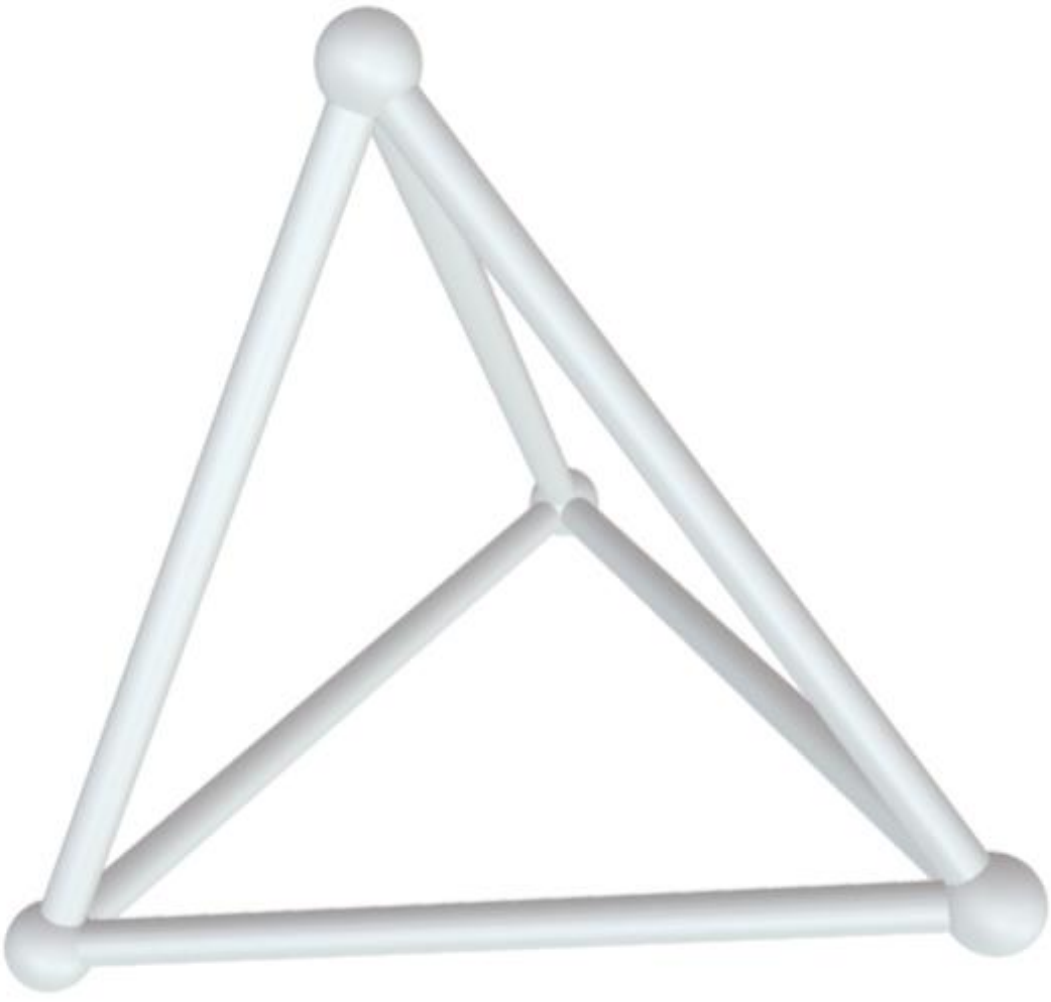
Reciprocal Physics

Physical Model from the Perspective of Technical Methods



„Mathematics is the language with which God has written the universe.”

Johannes Kepler



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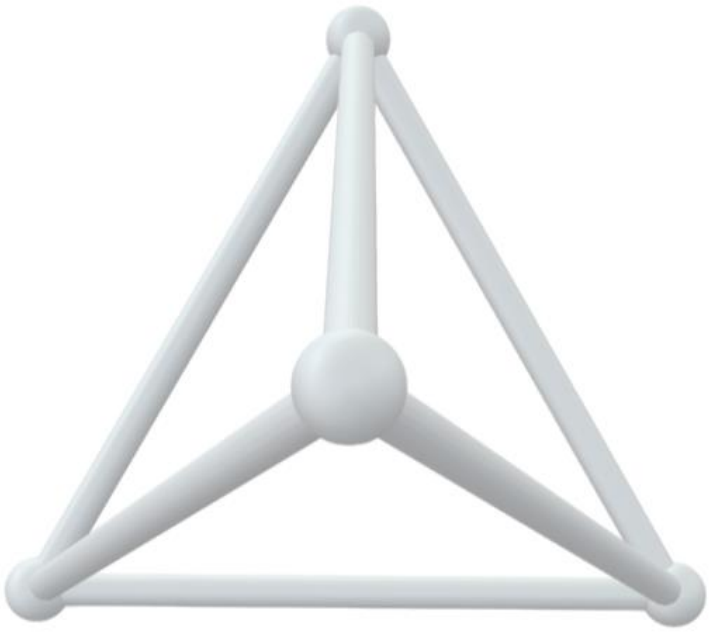
2024



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Contents:

1. Introduction

Reciprocal physics**,** or the physics of reciprocal relationships**,** is not a scientific treatise but rather an artificial construct, a model of the function of nature and the entire universe. This presentation of the model is based solely on the validity of mathematical and natural laws in their mutual relationships and dependencies.

"**Scientific findings can be expressed through mathematical formulas and laws**," - Albert Einstein. However, Einstein's theories are not without objections. There are contradictions between them and some current scientific hypotheses that have not yet been confirmed. Essentially, anything can be questioned, including Einstein's theories.

Engineering disciplines, however, are different. These fields rely on Einstein's theories as a fundamental pillar of all engineering. The principles on which engineering stands were used long before Einstein. From a philosophical perspective, we might say that science "believes in the incorrectness of Einstein's theories," while engineering "believes in their correctness." Neither of these positions is directly proven, so science may not acknowledge evidence of their validity. Therefore, it is important to clarify some differences between scientific and engineering approaches at the outset.

1.1. Scientific Methods of Investigation

Scientific methods operate based on established facts. Where facts are lacking, they are replaced by scientific hypotheses and theories. A typical approach that differs from engineering methods, or technical principles, is the creation of assumptions, hypotheses, and theories with the selection of the simplest path. Essentially, if multiple assumptions cannot prove the correct one, the assumption considered correct is the one that appears to be the simplest.

On this basis, there is often room for the creation of certain hypotheses and theories, which are then further developed. This continues until there is significant evidence of their incorrectness. There may also be a tendency to adapt surrounding phenomena to these hypotheses or theories. Such an approach can then be considered a kind of religion. Disproving and challenging such created hypotheses is not easily possible, as experiences from recent centuries, if not millennia, have shown us.

Example:

No one was present at the creation of the world. Therefore, the views on the origin of the world from various groups—Indians, Christians, Buddhists, materialists, and others—can be equally valid. For instance, there is no specific evidence of how dinosaur bones ended up in the ground. "Great Manitou" might have created them to mock future scientists. This interpretation might seem like the simplest one. (This example is not exaggerated; similar cases do indeed occur in practice.)

1.2. Systematic Construction Methods

If it was possible to build physics on the premise of questioning Einstein's theories, it is also possible to construct a physical system in accordance with these theories. This approach is represented by systematic methods. The model of reciprocal physics was developed using methods employed in systems engineering, not methods considered scientific in the Czech Republic. It was created based on verified natural laws and principles.

Systemic methods follow the principle that facts cannot be overridden by assumptions. Hypotheses not supported by any evidence must be examined using systemic analysis methods and assessed in the context of other objective natural or mathematical laws. Where a clear result is not achieved, it is necessary to determine which hypothesis does not conflict with the sought model.

Systemic methods are based on the assumption of complete harmony among all interactions between individual elements, subsystems, and systems. In this approach, it is unthinkable for one element or subsystem to be in conflict with the others. This means that two hypotheses cannot be in conflict with each other, as is sometimes the case with some scientific physical models. An example might be the conflict between the hypothesis of energy conservation and the hypothesis of quantum physics.

1.2.1. Systemic Principles

Under systemic principles, no hypothetical possibility of a phenomenon's origin can be excluded until it has been thoroughly investigated and evaluated. It is essential to conduct a systematic analysis of interactions between individual elements and subsystems of physics and their functions. (section 1.2.3)

For example, some physical systems state that the redshift of the light spectrum of distant bodies in the universe is caused by the speed at which the bodies are moving away from the observer. However, redshift can have various causes (see chapter 3.4). This difference illustrates the distinctions between systemic principles and scientific methods.

So far, there has not been a single piece of evidence that "redshift" arises solely from the movement of bodies, as presented in some scientific treatises. It is often mistakenly considered a scientific approach to ignore certain possibilities for the origins of phenomena without proper evaluation. Systemic methods do not permit such practices.

These differences are not limited to "redshift of the spectrum." For instance, gravity can arise in two real ways: either bodies are pushed towards each other or they attract each other. However, it has not been proven that bodies attract each other.

Describing the nature of phenomena such as magnetism, electricity, light, and the function of the universe in current scientific or popular-scientific literature is often at a speculative level. If these theories conflict with Einstein's principles, they are unusable for systemic methods. (see further chapters)

1.2.2. Technical and engineering methods cannot work with infinity

Infinity cannot be incorporated into mathematical formulas applicable in technical disciplines. For example, operations like ∞ divided by 2 have no meaning in an engineering context. While theoretical mathematics deals with infinity and develops various theories related to it, engineering disciplines work only with real numbers, no matter how large they may be.

The hypothesis of an infinite universe has not yet been substantiated by any evidence. Although mathematics is not usually considered a natural science, it adheres to the same principles of systems engineering as natural sciences. Thus, different "mathematical systems" can be created (which is not the subject of this discussion) that may be fully consistent with Einstein's theories.

1.2.3. System Analysis and Synthesis

After completing the system analysis, it is essential to perform system synthesis. This means that each "examined element" must be integrated into the broader system. If integration is not possible, it may indicate an error in the analytical element or in the system's structure itself. In such cases, the process must be

repeated. It is not enough to merely identify deficiencies in the interactions between connected elements; it is necessary to ensure that the system as a whole does not contain contradictory solutions.

The result of system synthesis must be a coherent system without contradictions between the interactions of individual elements and subsystems. A hypothesis that contradicts the results of analytical findings has no place in such systems. Just as it is impossible to build a bridge without considering the effects of natural laws, it is not possible to construct physics based on hypotheses that are in conflict with other physical laws.

1.3. The Result of Reciprocal Physics

The result of reciprocal physics does not necessarily reflect the true state of affairs. It is merely a model of the functions of the universe, physics, and nature, built on the assumption of the validity of Einstein's theories, without any exceptions. This model is constructed to be in alignment with Einstein's theories. Thus, we can say that it is based on the assumption of the validity of these theories.

The advantage over the traditional scientific approach is that this model allows for a narrower perspective, thus simplifying the range of possible solutions.

1.4. Problems with Hypotheses

A number of unproven assumptions and current scientific hypotheses in physical models that challenge Einstein's theories cannot be incorporated into the reciprocal physics system for the following reasons:

- **Conflict with Einstein's Theories:** Some hypotheses are in direct conflict with Einstein's theories, which excludes their inclusion in a model based on these theories.
- **Redundancy in the System:** If all phenomena can be explained through logical or mathematical-logical procedures without the need for additional assumptions, these hypotheses are redundant.
- **Violation of Natural Laws:** Models that include redundant forces or components not explainable within the framework of Einstein's theories may violate fundamental natural laws, especially the laws of conservation of energy and matter.
- **Transition to Mysticism:** Incorporating redundant components may push the system into the realm of mysticism, which technical methods cannot handle. Technical methods require that all components of the system be clearly defined and measurable.

1.5. Meaning of the Term "Reciprocal"

The term "reciprocal" has two main meanings in this context:

1. **Mutually Related:** This meaning refers to the mutual interconnection or relationship between two or more elements that affect or influence each other.
2. **Reciprocal Value:** This meaning pertains to mathematics, where the reciprocal value of a number $\boldsymbol{x}$ is equal to $\boldsymbol{1/\chi}$.

In the following text, we will explore what specifically relates to each other within the framework of reciprocal physics and what represents the reciprocal value. We will focus only on the differences from the currently accepted model of physics. Principles that are the same in both models will not be discussed in detail, as these aspects are already covered in existing physical treatises. Similarly, principles of chemistry will not be addressed unless they show significant differences (see Chapter 11).

1.6. Assessment of This Work

This work was submitted to the Czechoslovak Academy of Sciences in 1979 as a discovery application. However, it was rejected on the grounds that it was a hypothesis. The reason for the rejection was that the work did not take into account the fact that many natural and mathematical laws can be challenged by various hypotheses. In other words, it is possible to create any number of different hypotheses at the scientific level.

1.7. Publication of the Brochure – Reciprocal Physics

To make this work available to the public, the first edition of the brochure titled *Fundamentals of Reciprocal Physics* was published in 1997 and is available in various libraries not only in the Czech Republic. This edition differed from previous ones mainly in the way the content was presented, with individual theses arranged in a more logical sequence and supplemented with some principles of engineering models.

This is the first English edition, based on the second Czech edition from 2024, with a focus on improved readability and clarity.

2. The energy is fundamental

The only fundamental element and cause of all phenomena in nature and the Universe is energy.

The properties of energy, as described here, differ from the current scientific understanding because they are tailored to create a unified system. These properties are "established" for the purposes of this system but are not "proven" in terms of current scientific hypotheses. If these properties differed from the parameters listed below, it would be impossible to create a coherent model of how nature functions, and the entire system of the Universe would be based on foundations unknown to us.

2.1 Energy is a material substance that propagates in all directions and from all sides,

intermingling with all its forms. This principle of interpenetration is not unusual in nature; similar phenomena can be observed with gases and liquids, as noted in school textbooks. The most well-known example is sound, which also spreads in all directions. The main difference lies in the speed of propagation. Energy in a vacuum travels faster than in other mediums, with its speed referred to as the "speed of light."

Irish engineer Alphonsus Kelly had already experimented with the speed of light, and based on his measurements, he concluded that the **speed of light** is not constant, even in a vacuum.

Note: *The claim that nothing exists in a vacuum is merely an unverified hypothesis. Contemporary science refers to light as "electromagnetic waves," but technical fields can only use this definition if it is clear what is meant by "electromagnetic waves." Waving of "absolute nothing" is impractical and non-functional in technical disciplines.*

2.2 The product of energy density *p* and its speed *C* is constant in the rest state

The formula $\boldsymbol{p \cdot c = konst.}$ is one of the fundamental relationships without which our entire model would be impossible to construct. This relationship expresses the dependence of energy density on its speed. It is evident that the speed of energy is directly influenced by its density, and the energy density can also be determined based on its speed (see section 3.3.5). The propagation of energy can be compared to the propagation of light with zero frequency. This relationship is crucial for examining static phenomena such as uniform motion, mass, magnetism, time, and so on (chapters 4, 8, 10).

On the other hand, the relationship $\boldsymbol{p \cdot c = konst.}$ allows for the examination of dynamic phenomena using technical methods, such as accelerated motion, gravity, electricity, and others (see chapters 5, 9).

2.3 Energy has its extreme limits of density, which determine the maximum amount of energy that can be concentrated in a given volume.

2.3.1 Formation and Density of Particles

If, in the formula $\boldsymbol{p \cdot c = konst.}$, the speed of energy approaches zero, bodies with such density are created that they are impermeable to energy. In current physics, this corresponds to elementary particles such as protons and electrons (7.1.). Flowing energy either reflects off these particles or bends and flows around them (7.2.2.).

2.3.2 Space without energy and antimatter

If the speed of energy exceeds all known limits, we can speak of space without energy, which current physics refers to as **"antimatter"** (4.2.6.). Based on current scientific knowledge, the nature of energy cannot yet be determined more precisely.

2.4 The space we are in contains matter, energy, speed, distance, and time

These fundamental elements are necessary for the existence of the matter cycle, of which we can observe only a small segment of time. Despite the lack of knowledge, we can use technical methods to approximate the beginning and end of this cycle in the universe, but we are unable to determine its purpose.

2.5 Force is the result of the action of energy and manifests only as pressure

From the perspective of reciprocal physics, one can consider force as arising solely from energy. Technical disciplines do not recognize a force that exists independently of energy. No construction, building, or invention involves such a force. There is ample evidence that force arises from the action of energy, while there is no evidence for a force that arises without energy. Forces acting in nature provide information about energy, enabling its examination, evaluation, and uncovering of its properties using engineering methods.

2.6 States of Energy

Based on systemic analysis and subsequent synthesis, we can distinguish three different 'states' of energy in addition to common thickening.

2.6.1 Solid – This state is found, for example, in nucleons (protons, electrons) or energy sources such as black holes or white holes. These bodies achieve the highest possible energy density and have their own dimensions, as implied by the law of conservation and the impermeability of matter. They are completely impermeable to propagating energy. Details about "solid bodies" are given in Chapter 7.

2.6.2. Material – This type of substance forms atoms, which make up the Earth and our surrounding world. Material bodies arise in energy vortices where the pressure is not high enough for the formation of solid substance. In these areas, where nucleons are not present, energy is permeable, though with higher density and thus lower speed. Details about "material bodies" can be found in Chapter 7.

2.6.3. Gaseous – This substance arises from the decay of solid and material bodies. It is present not only around us but also in the "vacuum" and serves as a carrier of light (see Chapter 6). Gaseous substances can have various densities, up to the level of solid bodies. More information about "energy" can be found in Chapter 3.

2.6.4. These three forms of energy have the same physical nature, whether we refer to them as energy or matter. All of nature and the universe are based on several fundamental properties of energy, as described in this chapter. These properties repeat in nature and the universe at different levels:

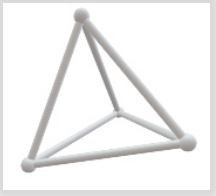
- **At the nucleon level** – This level includes the cycle of matter in nature and nuclear reactions (Chapters 2.6.1 to 2.6.3).
- **At the atomic level** – Here, chemical and biological cycles are found, including chemical reactions (Chapter 10).
- **At the molecular level** – An example is the water cycle in nature, which is influenced by gravity.

2.7. Energy propagating through space is the only active element of the universe that creates all the phenomena of the material world surrounding us, such as gravity, electricity, light, chemical bonds, and life. These phenomena result from the functions and interactions of the fundamental principles of energy. Nothing else exists in nature or the universe. (Details can be found in Chapter 3.)

2.8. Energy has at least one additional property that allows for the formation of two other types of solid bodies, such as protons and electrons. Due to a lack of information, technical methods cannot precisely determine what type of this property is. It may be a specific shape of energy "particles," historically known as gravitons, or other conditions that allow for the formation of these elementary particles. This aspect remains speculative, and science has not yet pursued this direction.

2.9. Based on the established principles of the nature and function of energy, it is possible to logically and mathematically derive all natural phenomena within the entire Universe, without any phenomenon contradicting other objective natural phenomena. Every natural phenomenon is fundamentally derivable from other phenomena and is in accordance with mathematical laws. Although the principles of quantum physics may contradict some current physical hypotheses, they are not in conflict with the principles of reciprocal physics.

3. Structure and Function of the Universe



Our universe is finite and has a specific shape – a tetrahedron (triangular pyramid).

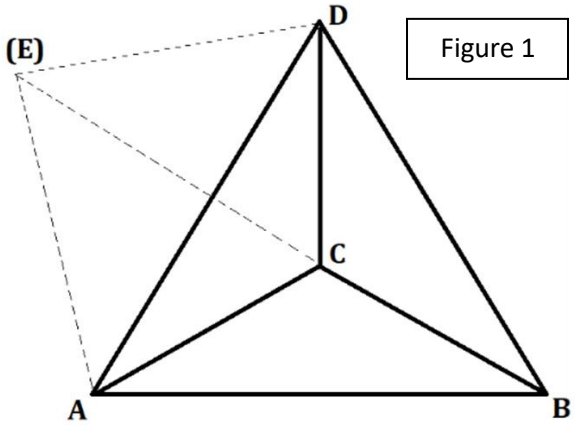


Figure 1

3.1. The vertices of the cosmic tetrahedron are formed by four sources of energy, which can be more easily understood in current terminology as "white holes." These sources of energy serve the opposite function of black holes. (3.3.)

3.2. The shape of the universe is determined by the properties and functions of energy in accordance with geometric laws. Two sources of energy create a line, three sources define a plane. Only four sources can create space. If we added a fifth source, the space would split into two separate universes (see Figure 1). It is possible that our universe is surrounded by other similar universes, which ensure its stability, suggesting the existence of a system of cosmic tetrahedrons. In this context, we might consider the "infinity of the universe," although such a consideration remains speculative and can be derived through systemic methods.

Note: *Most expert and popular science publications assume that the universe is infinite. It is rarely pointed out that this is an unproven assumption (1.2.2). According to systemic analysis, this assumption is unusable. Within this model, the universe has a different dimension that corresponds to Einstein's theories. Technical fields work exclusively with real numbers, and none of their sums demonstrate the existence of an infinite universe.*

3.3. Using technical models, a single model can be constructed that corresponds to the requirements stated at the beginning of this treatise. The described properties of energy, in accordance with Einstein's theories, ensure the functioning of the universe, including the circulation of matter and energy.

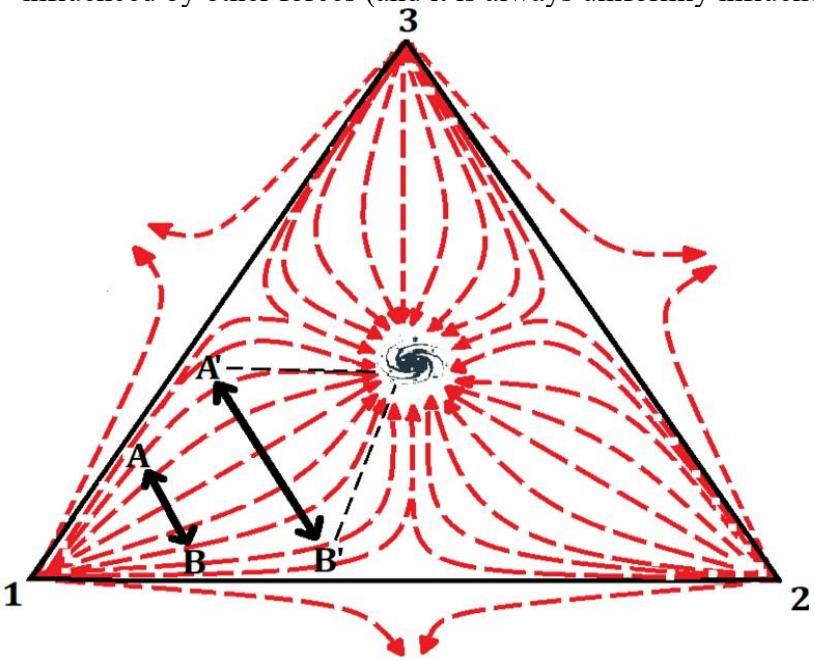
3.3.1. White holes

At this stage, the energy sources, or "white holes," undergo decay into energy according to the well-known Einstein formula $\boldsymbol{E = mc^2}$. The result of this process is the gradual "evaporation" of matter, which transforms into energy. This energy is the sole source of all activity in the universe, encompassing all physical and chemical phenomena, including "life" (Chapter 2). **This process occurs gradually and cannot result in any "Big Bang."** There is no known energy that could cause such an event, nor is it necessary.

Matter in a white hole gradually loses density and increases its speed under the pressure of the evaporating energy behind it. Energy cannot immediately reach maximum speed because, although it is pushed by the thinning energy behind it, it is simultaneously hindered by the thinning energy in front of it.

At the surface of the white hole, energy has zero velocity and maximum density. From this point, it starts to gradually increase its speed while its density decreases. This principle is well known from atomic and chemical reactions.

3.3.2. This radiating outflow of energy spreads in a straight line from its source unless influenced by other forces (and it is always uniformly influenced by the directions of energy rays from other sources). This primarily occurs in the direction from the source to the center of our cosmic tetrahedron.



Since the energy rays spread within the tetrahedron from four sources, they interact with each other as "material substance" based on Newton's law of action and reaction. This leads to the bending of the trajectories of individual energy rays towards the center of the tetrahedron.

In Figure 2 (simplified in a plane), the walls of the tetrahedron are represented as imaginary planes from which the energy rays curve inward towards the center of the tetrahedron. Because this spreading energy carries light and other radiation, we cannot logically obtain any information from potential neighboring tetrahedrons. Our knowledge and engineering disciplines allow us to study only the phenomena and realities that occur within our cosmic tetrahedron.

3.3.3. Near the center of the cosmic tetrahedron, where all surrounding galaxies are also located, energy spreads almost evenly from all directions. This phenomenon leads to a series of other effects caused by the bending of the direction of energy movement. This effect of space curvature is similar to what Einstein describes as the curvature of the universe.

Example from Figure 2: An object of size **AB** appears to an observer near the center of the tetrahedron as significantly closer, more diffuse, and larger, for instance, like a quasar, than it actually is (in the figure, it is depicted as size **A'B'**). In this space of the cosmic tetrahedron, a spatial phenomenon occurs that in reciprocal physics resembles an optical illusion.

3.3.4. Where there is uneven interaction of energy pressures, vortices of energy and its condensation are created. These phenomena manifest as galaxies, star systems, stars, and similar structures. Even within our solar system, which we can consider a very calm place within the cosmic tetrahedron, there are areas where slight uneven energy flows occur. Examples include the 'mysterious' push of the Galileo probe, the deceleration of the Pioneer 10 and 11 probes, the precession of Mercury's perihelion, and gravitational anomalies in some Kuiper belt objects. Contemporary cumbersome science has yet to find an explanation for these phenomena.

3.3.5. Condensation of energy is a phenomenon that can be defined using Einstein's formula $\boldsymbol{E = mc^2}$, where in this context, the formula can be rewritten as $\boldsymbol{m = Ec^{-2}}$.

This means that the formation of matter from energy can occur in various ways. As the formula suggests, matter can form either by changing the structure of energy or by significantly reducing its speed, or a combination of both factors.

Note: *Contemporary science uses only one form of Einstein's equation,* $\boldsymbol{E = mc^2}$*,which describes only the creation of energy from matter. Engineering methods cannot work with one-way formulas alone. If this formula is valid, then its other forms must also be equally valid, for example,* $\boldsymbol{m = E \cdot c^{-2}}$ *(formula for the creation of matter from energy) or* $\boldsymbol{c = (E \cdot m^{-1})^{1/2}}$ *(formula for the essence of energy speed).*

3.3.6. The next phase of development falls within the realm of contemporary research and is observable through modern scientific methods and instruments. In this phase, so-called black holes are formed, which appear as a result of high pressures and energy, primarily in locations that provide conditions for such phenomena, such as the centers of large stars or galaxies. Black holes, as described in the literature, absorb all surrounding matter. Within reciprocal physics, black holes are defined as "environments allowing only one direction of pressure, which affects the movement of all substance of energy."

3.3.7. The final phase necessary for maintaining the circulation of matter involves the merging of black holes into a single **black hole** located at the center of the cosmic tetrahedron. At the end of their lifespan, **"white holes"** also disappear when they "radiate" their last remaining energy. This leads to the cessation of the pressure of these forces in the cosmic tetrahedron, resulting in the breakdown of all remaining bodies.

3.3.8. Massive black holes in the centers of surrounding cosmic tetrahedrons, which are no longer held by high pressure, begin to **transform and revert to white holes**. These centers thus become new sources of energy, leading to the formation of new tetrahedrons. This process triggers a **new phase of the circulation of matter and energy in the newly created cosmic tetrahedron**, based on the newly formed white holes. **The entire cycle then repeats** from point 3.3.1.

3.4. Measuring distances in the universe is currently imperfect because it doesn't take into account that "energy" has different speeds in various parts of the universe. Around the center of the cosmic tetrahedron (for example, in the Milky Way and its surroundings), we don't need to consider this fact. However, near energy sources, the situation is different, as the speed of energy is significantly lower. This leads to various irregularities, which are visible at the very center of the tetrahedron, such as anomalies.

One example of a typical anomaly is the redshift in the light spectrum. This phenomenon is caused by the fact that light, which is produced by energy passing through a material body closer to energy sources, has a lower speed than light in the space at the center of the cosmic tetrahedron. See point 3.3.3 and figure 2.

Note: *In current scientific literature, it is stated that the "redshift of the spectrum" in more distant parts of the universe is caused by the movement of a body away from the observer. This theory may give the impression that it represents a scientifically proven objective truth. However, it is important to realize that this is merely speculation, which may not hold true in alternative models of physics.*

The "redshift of the spectrum" is actually just a consequence of the Doppler effect, which depends on at least three variable factors. If none of these factors occur, the Doppler effect cannot arise in principle. See Chapter 14.

These three factors causing the Doppler effect are:

1. **The movement of the object** being observed

2. **The movement of the observer** tracking the object
3. **The movement of the medium carrying the information** – just as sound travels at different speeds in air, water, or steel, light also propagates at different speeds in various media, such as vacuum, air, or glass.

It is irrelevant whether the "redshift of the spectrum" arises due to the movement of the object, the movement of the observer, the varying speed of light in different parts of the cosmic tetrahedron, or a combination of these factors. In the universe, we always observe the same phenomenon of redshift (although, depending on the circumstances, the shift can also be violet or blue).

The fact remains that **there is no conclusive evidence for the "expansion" of the universe**. Systematic fields must take all these factors into account. Theories about the expansion of the universe without clear evidence have only speculative value and are unusable for technical methods. These theories are often presented in speculative literature, which can be found in bookstores, libraries, and sometimes even in scientific institutions.

3.5. The cycle of energy in the universe

It operates on practically the same principle as, for example, the water cycle on Earth.
The simplicity of the universe's functions does not allow for any other solution, which means that similar phenomena and cycles occur at various levels of energy condensation. The differences between these phenomena are only reflected in the amount of energy needed for their formation.

3.6. Inaccuracies in the Cycle

It is important to consider that numerous irregularities can occur in the cycle of energy.

4. Mass

Mass is a phenomenon that arises from the resistance of the energy of the surrounding space against changes in the motion of an object.

In this system, any object in the space of the cosmic tetrahedron is considered a passive obstacle that the flowing energy either passes through or bypasses, depending on the density of the object. A massive object, such as the Earth, appears almost empty to the flowing energy because it does not provide significant resistance. Thus, all observed cosmic phenomena are easily explained in this way.

4.1. The mass of an object depends on the surface area of its exterior, not on the volume of "matter" that the object represents. A hollow object will offer the same resistance to flowing energy as a solid object with the same surface area. Thus, both objects are considered to be equally "massive." This further implies that the mass of the same object can vary depending on different conditions or locations within the cosmic tetrahedron. An object will have a different mass near the center of an energy vortex, at the edge of the cosmic tetrahedron, during the movement of the object, and so on.

Note: *Reciprocal physics cannot accept the concept of an immutable mass value in the active space of the cosmic tetrahedron, as it would violate mathematical principles.*

4.1.1. The mass phenomenon of a stationary object in the space of the cosmic tetrahedron is directly proportional to the size of the surface area affected by the spreading energy. This relationship can be expressed by the following formula:

$$\boldsymbol{m_0 = \Sigma F_e . P}$$

where $\boldsymbol{m_0}$ is the mass of a stationary object, $\boldsymbol{\Sigma\, Fe}$ is the total force of energy pressure on the object, and $\boldsymbol{P}$ is the total surface area. This formula clarifies the entire problem of gravity. It is important to understand that massive objects, as we understand them according to current physics, are actually "empty objects" (7.2.2).

Note: *Although energy propagates at the speed of light and is also its carrier, it is denoted with the index* ***e*** *for force, rather than* ***c*** *as is customary for the speed of light. Energy that propagates without frequency (i.e., without pulsation) is not light but creates phenomena, such as mass, in a similar manner.*

4.1.2. Mass of a body depends entirely on its surface. For example, if we add up the masses of two protons and two neutrons that make up a helium atom's nucleus and compare it to the mass of the helium atom itself, we find that the mass of the helium nucleus is lower. This phenomenon is caused by the fact that the surface area of the helium nucleus is smaller than the sum of the surfaces of the individual nucleons. The nucleus of the atom represents a new entity with a smaller surface area than the sum of the surfaces of the four nucleons. Physics that questions Einstein's theories cannot logically explain this phenomenon and has only resorted to the concept of "mass gaps" in atomic nuclei.

4.2. The assessment of gravitational phenomena for a body moving within the cosmic tetrahedron is more complex. In reciprocal physics, the body moves in a space where energy spreads as a material substance. This movement causes the gravity acting on the body to differ from the gravity in a stationary state. Gravity on a moving body is influenced by this spreading of energy, leading to different gravitational phenomena compared to a stationary body.

4.2.1. In a stationary state, where a body does not change its position within the cosmic tetrahedron, the formula from section 4.1.1 can be expressed as follows:

$$\boldsymbol{m = m_0 \cdot \frac{F_{eA}}{F_{eA}} \cdot \frac{F_{eB}}{F_{eB}} = m_0}$$

where:

- $\boldsymbol{m}$ is the mass of the body,
- $\boldsymbol{m_0}$ is the mass of the body in stationary state,
- $\boldsymbol{F_{eA}}$ and $\boldsymbol{F_{eB}}$ are the energy pressure forces on the body at different points, which cancel or balance each other.

This formula shows that in a stationary state, where the body does not change its position and the energy pressure forces balance out, the mass of the body is equal to its mass in the stationary state.

This means that if the actions and reactions on both sides of the body are the same, then the mass $\boldsymbol{m}$ is equal to the mass in the stationary state $\boldsymbol{m_0}$. In this case, the body is in equilibrium and its mass does not change.

However, a different situation arises if the body is set into motion. In the moving state, the dynamics of interaction between the body and the surrounding energy spread changes, which can affect the phenomenon of mass.

4.2.2. Example of Motion of an Object

In Figure 3, an example is shown where an object moves at a velocity $\underline{\boldsymbol{v}}$ from any point in the cosmic tetrahedron from direction $\boldsymbol{B}$ towards $\boldsymbol{A}$.

- **Forces acting on the object:**
  - **Directed from $\boldsymbol{B}$ towards $\boldsymbol{A}$**: The object will experience a force $\boldsymbol{F_{eB}}$, with a corresponding reaction force on the object $\boldsymbol{F_{eB} - F_v}$.
  - **Directed from $\boldsymbol{A}$ towards $\boldsymbol{B}$**: The object will experience a force $\boldsymbol{F_{eA}}$, with a corresponding reaction force on the moving object $\boldsymbol{F_{eA} - F_v}$.

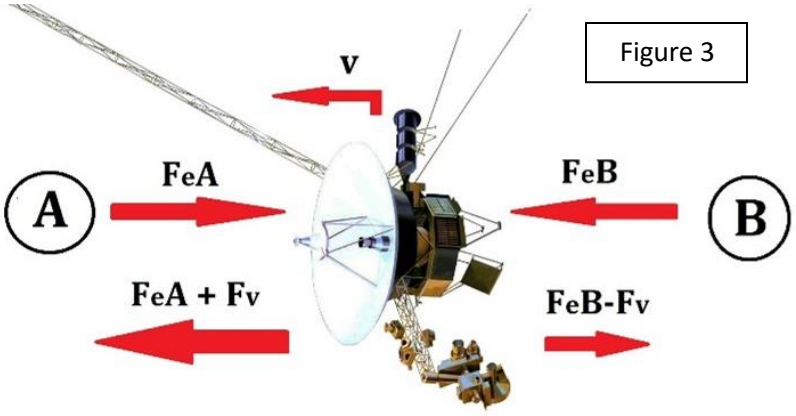


Figure 3

Explanation

•**Force $\boldsymbol{F_{eB}}$:** This force is exerted on the object from region $\boldsymbol{B}$, where the object is exiting.
•**Force $\boldsymbol{F_{eA}}$:** This force acts on the object from region $\boldsymbol{A}$, where the object is heading.
•**Reaction force of the moving object $\boldsymbol{F_v}$**: This is a result of the relative motion of the object within the cosmic tetrahedron, which affects both the forces acting on the object and its corresponding reactions.

This model demonstrates how the dynamics of force and mass of an object change when it is in motion within the cosmic tetrahedron, compared to its state at rest.

Then it follows that:

$$\boldsymbol{m \cdot m = m_0 \cdot \frac{F_{eA}}{F_{eA} + F_v} \cdot m_0 \frac{F_{eB}}{F_{eB} - F_v} > m_0 \cdot m_0}$$

This equation illustrates the change in the mass of an object in motion within the space of a cosmic tetrahedron compared to its resting state.

Explanation:

- **Change in the Mass**: When an object is in motion, its mass changes depending on the direction of motion relative to the spreading energy.
  - **Against the Direction of Motion**: The mass response is higher by $\boldsymbol{F_v}$.
  - **In the Direction of Motion**: The mass response is lower by $\boldsymbol{F_v}$.

This is the essence of the change in the mass of an object.

In Reciprocal Physics: This system shows that the change in mass is not caused by the object's speed itself, but by its interaction with the spreading energy in the space of the cosmic tetrahedron.

This is the essence of the change in the mass of a body moving in the space of the cosmic tetrahedron compared to its stationary state. Against the direction of the body's movement, the mass effect reaction is higher by $\mathbf{F_v}$ while the reaction in the direction of the body's movement is lower by $\mathbf{F_v}$. In reciprocal physics as a technical system, **it is inconceivable that mere speed could change the phenomenon of mass.**

4.2.3. Simplified Form of the Equation

Assuming the object is moving in an area close to the center of the cosmic tetrahedron, where the energy force acting on the object from all sides is approximately the same (i.e., $\mathbf{F_{CA} = F_{eB} = F_e}$), we can simplify the equations from 4.2.2 to:

$$\boldsymbol{m = m_0 \cdot \frac{Fe^2}{Fe^2 - Fv^2}}$$

This form of the equation is simplified and uses the assumption that the forces acting on the object from all sides are the same, which simplifies the calculation of the mass $\boldsymbol{m}$ of the object in motion.

4.2.4. Adjustment of Relationships for Contemporary Physics

For easier understanding of the relationships within contemporary physics, we can use the following adjustment. Let us denote:

- $\boldsymbol{F_{cA} \cdot F_{cB} = F_e^2 = c^2}$, where $\boldsymbol{c}$ is the speed of light,
- $\boldsymbol{F_{vA} \cdot F_{vB} = F_v^2 = v^2}$, where $\boldsymbol{v}$ is the speed of the object,

Then the formula for the mass of an object in motion can be rewritten in a more comprehensible form:

$$\boldsymbol{m = m_0 \cdot \frac{c^2}{c^2 - v^2}}$$

This formula expresses the relationship between the mass $\boldsymbol{m}$ of an object in motion and its rest mass $\boldsymbol{m_0}$, incorporating the effect of relativistic speed $\boldsymbol{v}$ in the context of the speed of light $\boldsymbol{c}$.

If we expand it with the term $\boldsymbol{\frac{c^{-1/2}}{c^{-1/2}}}$, we obtain the form of the equation known as the relativistic formula.

Thus:
$$\boldsymbol{m = m_0 \cdot \frac{1}{1 - \sqrt{v^2/C^2}}}$$

This formula is known as the formula of the theory of relativity, where $\boldsymbol{v^2/C^2}$ is the relativistic factor that describes the change in mass depending on the velocity $\boldsymbol{v}$ relative to the speed of light $\boldsymbol{C}$.

Note: *The derivation of what is now known as the "Lorentz time transformation" (Chapter 10) made it only a matter of time before the resulting "imbalance" would be compensated by a corresponding "correction." Albert Einstein was the first to notice this "inconsistency" and, based on it, derived the compensating "principle" now known as "the theory of relativity." Einstein understood that if the "time transformation" formula holds, then the "relativity theory" formula must also hold.*

4.2.5. Disadvantages of Einstein's Formula

Einstein's formula of the theory of relativity, presented in section 4.2.4, represents only a special case of a broader formula, as indicated by the equation in section 4.2.3. Within the framework of reciprocal physics, this formula has drawbacks because it does not provide a clear overview of the phenomena occurring in the immediate vicinity of an object at high speeds.

Within reciprocal physics, this formula can be derived through a simple logical-mathematical procedure, suggesting that it may represent an approach to physical phenomena that provides a more detailed understanding than the relativistic approach.

4.2.6. Movement of an object at high speed

It is entirely understandable that, when an object moves at high speeds in the space of a cosmic tetrahedron, external energy influences cause the object to flatten. If the object reaches a speed corresponding to the speed of energy propagation (the speed of light), the energy coming from one side (e.g., from side **B**) cannot catch up with the object. **This situation leads to the creation of an " empty space " from the perspective of energy from that side.**

As a result of this phenomenon, the cohesion of the body on the side where the energy speed cannot catch up with the body disappears. The body disintegrates into energy that fills the resulting empty space. This process causes the space after the body's disappearance to reach a new equilibrium state, which is maintained by the relation $\boldsymbol{p \cdot c = konst}$, where $\boldsymbol{P}$ is the pressure and $\boldsymbol{c}$ is the speed of light.

Note: *In some physical models, the term "antimatter" appears in connection with the "empty space" described above. This term attempts to describe a material that is supposedly "opposite" to ordinary matter. However, in the reciprocal physics system,* ***"antimatter"*** *is seen as an unnecessary luxury that is essentially redundant.*

In our approach, the basic principles of energy propagation and its interaction with matter in the space of the cosmic tetrahedron are sufficient. The concept of "antimatter" would seem like a royal inefficiency in dealing with a phenomenon that we have elegantly resolved. So while some are still searching for "antimatter" in complex theories, we are content with what is right in front of us – without the need for complicated twists and terminology.

4.3. The phenomenon of gravity in the space of the cosmic tetrahedron

The phenomenon of gravity in the space of the cosmic tetrahedron is, in addition to what has been mentioned above, also influenced by other factors that we will describe here. The resulting gravitational effects are the sum of all these factors.

5. Gravity

Gravity is a phenomenon that occurs around every body and is caused by the shielding of one of the directions of flowing energy, either by the body itself or by other present bodies.

5.1. Possible Causes of Gravity: Two Variants

Through the forces causing gravity, we can often observe the behavior and properties of energy through human senses. Technical methods and logical reasoning reveal that there are only two variants that could be the cause of gravity.

5.1.1. Variant One: Bodies are Attracted to Each Other

According to this variant, bodies are attracted to each other. However, systemic analysis suggests that this model encounters problems with the law of conservation of energy in many cases. According to this variant, a proton would influence the motion of many protons and electrons through its gravity, which would lead to changes in trajectories in space.

Additionally, if such forces existed, a proton would have to expend an amount of energy over billions of years comparable to the explosion of a hydrogen bomb. Measurements of the energy released during proton decay show that it is very small and can only be detected by sensitive instruments. Technical systems are unable to work with forces that exist without expending energy, because, as noted by Isaac Newton, such forces are incomprehensible.

5.1.2. Variant Two: Bodies are Pushed Towards Each Other

In this variant, no problems or contradictions with natural and mathematical laws arise. Bodies are pushed towards each other by external energy that permeates the universe. This phenomenon is well observable with technical methods and can be mathematically justified.

5.1.3. Other Possibilities

All other possibilities and various hypotheses that are proposed are in conflict with the assignment and are not usable with our methods.

5.2. Effect of Energy Force in Space Near the Center of the Cosmic Tetrahedron

In Figure 4, the effect of the energy force in space near the center of the cosmic tetrahedron on a material body that is permeable to energy is illustrated. The force $\mathbf{F_e}$ enters body **A**, where part of this force is reflected by the nucleons in the body. The force leaving body **A** is then weakened by $\mathbf{\Delta F_{eA}}$, and acts on body **B**. The force $\mathbf{F_c}$,enters body **B**, where it is weakened by $\mathbf{\Delta F_{cB}}$, and continues toward body **A**. This creates a force imbalance of $\mathbf{\Delta F_{eA}} + \mathbf{\Delta F_{cB}}$, which causes both bodies to move towards each other.

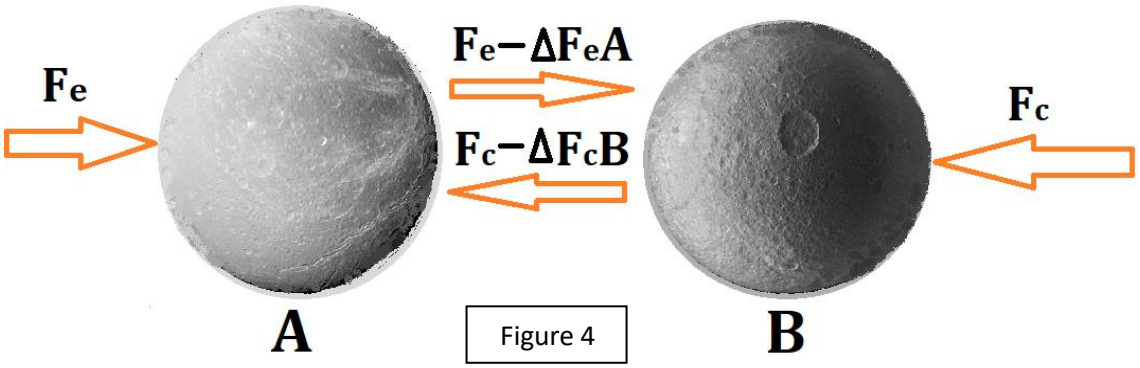


Figure 4

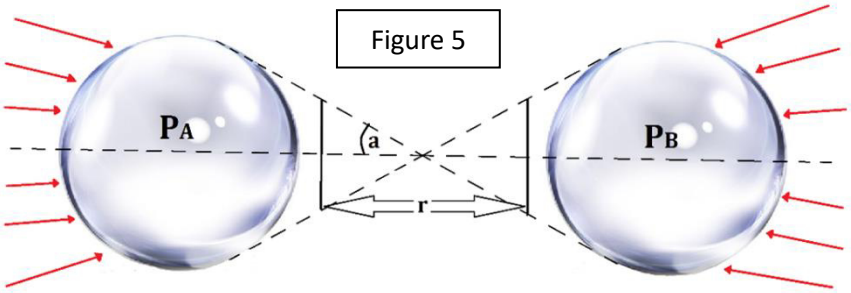
Note: *The debate over the nature of gravity has persisted in scientific circles for a quarter of a millennium. Aside from various sci-fi possibilities, gravity can only arise in two ways: either bodies are pushed towards each other (advocates of this view are called "gravitonists"), or they attract each other. Both possibilities produce the same manifestations. Although this debate is mentioned in numerous scientific publications, many others describe gravity as if bodies attract each other.*

Even Isaac Newton, the author of the law of gravity, refused to engage in this discussion with the words: "I do not invent suppositions." Although this debate is mentioned in numerous scientific publications, in others, gravity is always described as if bodies attract each other.

5.3. More Accurate Evaluation of the Phenomenon of Gravity

For a more accurate evaluation of the phenomenon of gravity, we use an example based on solid bodies that are impermeable to energy. This example is illustrated in Figure 5. The solid bodies are represented as surfaces of bodies $\mathbf{P_A}$ and $\mathbf{P_B}$. Arrows indicate the directions of the individual energy force rays acting on the surfaces of the bodies.

Figure 5



The bodies do not have a counterforce from the other side in the rotational cone of radius $\boldsymbol{a}$. From this, it can be easily deduced that the magnitude of the force with which both solid bodies are pushed towards each other is directly proportional to the sum of the surfaces of both bodies and inversely proportional to their distance.

Note: *The easy derivation of the gravitational law formula from the perspective of the gravitational hypothesis of mutual pushing of bodies was pointed out, among others, by Nobel laureate Richard P. Feynman in his 1965 publication Lectures on Physics (Chapter 13.2). Isaac Newton derived the gravitational formula through measurement and weighing. To technical methods, no mechanism is known by which the formula can be derived from the perspective of the principle of mutual attraction of bodies.*

5.4. Kepler's Laws and Other Laws of Gravity

Using the same logical methods, Kepler's laws and all other manifestations related to gravity can also be derived.

6. Light

Light is a phenomenon created by the pulsing of energy spreading through space at a frequency perceptible to the eye.

6.1. The Significance of Light Phenomena

Light phenomena provide us with valuable information about the properties of energy, although we only study the portion of the spectrum visible to our eyes. Historically, it was the only way to study phenomena in distant space. In the 20th century, with the use of other parts of the spectrum, such as radio waves and X-rays, we gained a deeper understanding of the universe and its laws. For example, X-ray research has shown that energy can be concentrated in space even without the presence of matter, supporting the assumption of its creation based on Einstein's formula $\boldsymbol{m = E.c^2}$. This discovery confirms the importance of mathematical methods in our understanding of physical phenomena.

There is currently no unified view on the nature of light. At times, it behaves like an electromagnetic wave, while at other times, it exhibits properties of matter. Attempts to separate matter from energy in some theories have proven inadequate. History has seen various theories, from Huygens' wave theory and Newton's emission theory, through the electromagnetic theory, to quantum theory, but none have satisfactorily explained all phenomena associated with light. Systematic analysis often reveals contradictions with objective natural laws.

Reciprocal Physics, based on Einstein's theories, proves to be an effective method for investigating light phenomena, even though some current definitions and hypotheses about light show incompatibilities with its framework. Nevertheless, light phenomena provide us with a unique insight into various principles and functions of energy, allowing us to understand natural laws that would otherwise remain hidden.

6.1.1. Indirect observation of phenomena

We can indirectly observe phenomena such as gravity, mass, and other cosmic events arising from the properties of energy.

6.1.2. We can directly observe the principles of energy

We can directly observe the behavior of energy because light itself is propagated energy. Through its pulsation, it does not alter the fundamental properties of energy, allowing us to better understand the principles and functions of energy.

6.2. Example of the Origin of Light

In **Figure 6**, the process of light generation is illustrated. Energy passes through a pulsation source, such as a light bulb. Atoms in the bulb's filament, vibrating due to heat, transfer their vibrations to the incoming energy. This energy then also vibrates and propagates further as light. Similarly, all other frequencies that are not visible to the human eye but can be detected by instruments are generated in the same manner.

6.2.1. Interaction with the Eye

When vibrating and pulsating energy strikes a material object that does not allow it to pass through, such as the retina of the eye, it interacts with this object. The eye perceives this phenomenon as light because the vibrating energy stimulates sensors in the retina. However, during this interaction, the pulsating energy mutually disrupts with the receptors in the retina. After this contact, the energy continues to propagate, but it

either ceases to pulsate or pulsates only at frequencies not visible to the human eye, while maintaining its original direction of propagation.

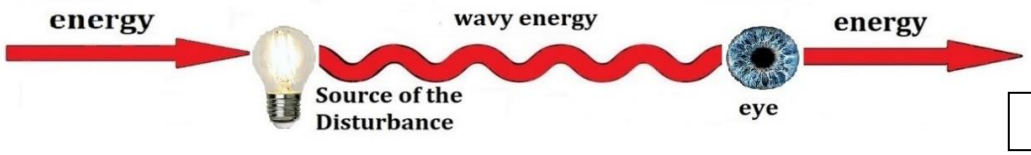


Figure 6

6.2.2. Creating Darkness from Two Illuminating Lights

Energy pulses, besides impacting an object, can also cancel each other out in other ways. A well-known method to create darkness from two illuminating lights is as follows:

If two light sources at equal distances are directed onto a white surface in a dark room, with both sources emitting light of the same wavelength **λ**, the intensity of the light will double. If one of the light sources is moved closer to the white surface by a distance of **λ/2** (**2 λ/2, 3 λ/2, 4 λ/2**, etc.), the light beams will interfere destructively, resulting in darkness. This happens because the individual pulses of the light beams combine in such a way that they no longer pulse, and since the energy no longer pulses, our eyes do not perceive the light.

6.3. Propagation of energy in all directions and all ways

Energy spreads in all directions and in every direction. We can observe this phenomenon through light. On a night sky, we see light spreading towards us from stars in all directions and in every direction. Similarly, light sources such as bulbs emit light in all directions.

6.4. The speed of energy propagation in different media

Energy can move at different speeds. Measurements have shown that light travels at different speeds depending on the medium. It moves slower in glass than in air, and faster in a vacuum than in air. This ultimately follows from Einstein's equation $\mathbf{E = mc^2}$, but in the form:

$$c = (E \cdot m^{-1})^{1/2}$$

Just like with sound waves, the Doppler effect also applies to light, affecting its propagation.

6.5. Energy Concentration Around Bodies

Around solid and material bodies, energy concentration occurs, as will be demonstrated further. These optical phenomena can be observed even with the naked eye.

6.5.1. Observation of Concentrated Energy in a Glass Prism

When we look into a glass prism, we can observe two reflective surfaces where light reflects. If we press these surfaces with damp fingers, the reflection at the point of contact disappears. Once we move our fingers away, the reflection immediately reappears because the glass has not permanently changed—there has been no deformation affecting the reflection or refraction of light. This simple experiment allows us to visually observe and touch the interactions between light and material, and demonstrates how light energy behaves when in contact with matter.

6.5.2. Change in Energy Speed and Its Compression

As mentioned in section (2.2.), when the speed of energy changes, it becomes compressed according to the formula $\boldsymbol{\rho \cdot c = konst}$. We know that light travels slower in glass than in a vacuum or air, indicating that the speed of energy propagation depends on the density of the medium. Since energy, as stated in section (2.1), is merely a "state of matter," it must become compressed before penetrating a body with higher density. Although the density of glass is only slightly higher than that of air, visible **energy compression** still occurs before it penetrates the glass. This layer of compressed energy can easily be disturbed or reduced by fingers, suggesting that it is not part of the glass itself. This phenomenon is perceived visually as shine or reflection of light. Where this compressed energy layer is absent, no reflection or shine occurs. The "thickness" of this layer depends on the structure of the body and its distance from the energy layers of surrounding bodies.

6.5.3. Newton's rings

When a layer of condensed energy around an object is evenly distributed, the reflection or shine of light around the object remains uniform. However, if this layer is restricted or weakened in certain areas, it leads to irregular reflections and refractions of light. This phenomenon is especially noticeable in photographic slides placed between glass slides. Deformation of the film at the point of contact causes an uneven distribution of the density of this energy layer, leading to various reflections and refractions of light, known as "Newton's rings."

Note: *Opinions on the origin of Newton's rings vary in current hypotheses. Some sources describe them as an unexplained phenomenon, while others claim they are caused by the presence of air between the glass slides. However, this theory is not convincing, as Newton's rings also appear in a vacuum, where air is absent.*

6.5.4. Layer of Compressed Energy and the Phenomenon of Light Refraction

A layer of compressed energy on the surface of a body is a key factor in the phenomenon known as "refraction of light." This phenomenon arises from the combination of several factors. The first is the ability of certain frequencies of energy to pass through material bodies, such as glass or water—in the case of visible light, these are the frequencies perceived by the human eye. Furthermore, as mentioned in section 3.3.2, energy bends in space, with opposite bending occurring around massive bodies. In the case of refraction of light, however, the direction of energy is deflected from the surface of the body due to the layer of compressed energy acting on the propagating light beam. (6.5.1) The degree of this deflection depends on the thickness and intensity of the layer of compressed energy. This layer not only reflects the light beam but also resonates at the same frequency as the light itself.

6.5.5. The slowing of energy at the edge of bodies and its consequences

At the surface of material bodies, energy slows down, leading to the formation of a layer of compressed energy. This energy then continues through the body at a lower speed than it would in a vacuum. When the energy exits the body, the layer of compressed energy again accelerates it to its original speed. If the energy is in the form of light, it also vibrates this compressed layer on the surface of the body. Similar to how energy pulses on the retina can cancel each other out, the energy continues through the body as non-pulsating. If the compressed layer at the interface between two media is removed or thinned, no light is reflected.

6.5.6. Refraction of light and its representation

In Figure 7, the phenomenon known as "refraction of light" is depicted. The light ray **"b"** enters the edge of a glass pane into the layer of compressed energy **"A,"** which is vibrated by its frequency. This ray is also

slightly deflected by this compressed energy. The degree of deflection of the ray depends on the thickness and density of the compressed energy layer. The ray then continues through the body in the direction **"a,"** which is deviated from the original direction. When the ray reaches the second edge of the glass pane at point **"B,"** it is bent back to its original direction by the compressed energy and continues as the pulsating energy ray **"c."**

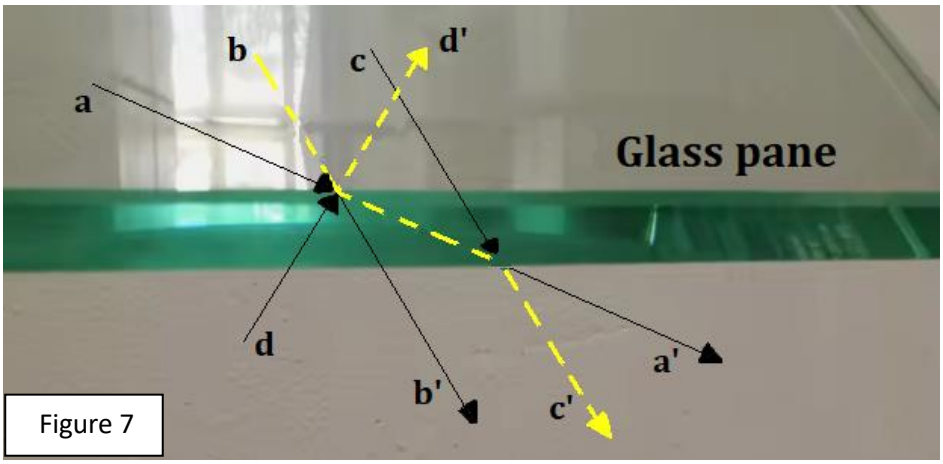


Figure 7

6.5.7. Reflection of light and its representation

In Figure 7, the phenomenon known as "reflection of light" is also illustrated. A pulse of energy **"b"** (light) enters the edge of a pane into a layer of compressed energy. If the pane is transparent, part of this pulse passes through and continues as beam **"a,"** while another part reflects off the pane outward as beam **"d."** If the pane is not transparent, such as in a mirror, both phases of beam **"d"** are oscillated, leading to a complete reflection of light. According to physical laws, the angle of incidence equals the angle of reflection.

6.5.8. Optical effects of combining surfaces and directions

By combining different surfaces and directions created during the crystallization of a transparent plate, we can achieve various optical effects, such as birefringence, which occurs in minerals like calcite, and similar phenomena.

6.6. Transparency of bodies

The transparency of bodies depends on their surface and internal structure.

6.6.1. Glossy and matte bodies

Glossy bodies have surfaces with irregularities smaller than the height of the visible layer of condensed energy on their surface. This is why mirrors are polished—glossiness results from the reflection of light from this layer. Conversely, matte bodies have surface irregularities larger than the visible layer of condensed energy, which causes light to scatter and results in a matte appearance. Opaque and matte bodies may have similar properties to transparent bodies, but their uneven surface or structure prevents the visibility of these effects. Nevertheless, different energy frequencies, such as X-rays or radio waves, can pass through these bodies, even though they are not visible to the human eye.

6.6.2. Opaque bodies

Opaque bodies are characterized by opacity and internal structure that prevents the passage of visible undulating energy (light) or allows only energies with frequencies outside the visible spectrum to pass through.

6.7. Real behavior of light in glass and prisms

When looking through a glass plate or prism, we notice that light escapes along various paths, albeit only minimally. This phenomenon is caused by irregularities in the material, the bending of light around individual atoms, and other factors that affect the path of light rays. In real conditions, unlike the ideal theoretical model, perfectly homogeneous light propagation is never achieved.

6.8. Dispersion of light

Dispersion of light is the result of a combination of light refraction and reflection, with the strength of the layer of compressed energy around an object playing a key role. In different materials, such as diamond or water, the strength of this layer varies. This difference affects how light interacts with the material and leads to different dispersion effects. Each frequency of pulsating energy interacts with the layer of compressed energy to varying degrees, causing changes in the bending of the light beam and its dispersion. A stronger layer of compressed energy causes greater bending of the beam and enhances the effect of light refraction.

6.9. Explanation of light phenomena

As shown above, all phenomena associated with "light" can be explained as the result of mutual interactions of matter in different states. There is no other principle or mechanism that explains these phenomena. All aspects of light behavior, from its propagation to its dispersion and reflection, are the result of how material substances interact and change their properties depending on their state and environment. And that's all, don't look for anything else in it.

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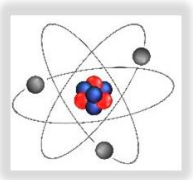
7. Structure of Material Bodies



Matter is a form of energy that significantly exceeds its surrounding environment in density.

As follows from (2.6), energy is merely a form of matter, or matter is a form of energy. This single substance constitutes the entire universe. Therefore, the question of the "name" of this form is more a matter of terminology. We distinguish three basic states, both of energy and of all elements and compounds in the universe. The nature of matter and how it arises has been the subject of speculation for centuries. Within the framework of reciprocal physics, based on the validity of Einstein's theories and systemic analysis, only one possible model is consistent, the essence of which is outlined below.

***Appendix**: The definitions of the terms "matter," "solid bodies," or "material bodies" here do not align with the commonly established concepts in contemporary physics. This is understandable, as the perspective on their structure and function in this system is diametrically different. However, the names have been adjusted to current nomenclature as much as possible, although it is not feasible to fully comply.*

7.1. Solid bodies

Solid bodies are composed of variously named solid particles, such as gravitons, quarks, or neutrinos, whose shapes are not known due to a lack of research in this direction. However, the shape of these particles must meet the condition of forming only two stable solid bodies—protons and neutrons (see 2.6.1)—which exist

in the space of the cosmic tetrahedron. These are entirely passive bodies that do not release any energy during their existence. They are created from energy according to the well-known Einstein equation $\boldsymbol{E = mc^2}$, but in the form $\boldsymbol{m = E/(c^2)}$, which expresses the formation of matter from energy. Other nucleons (including neutrons) are not stable and decay over various periods. The third solid body can be referred to as a "black hole," which, however, does not have a stable size and gradually grows. Similarly, a "white hole" emits energy, thereby decreasing its volume. These objects are not dependent on any specific shape of elementary particles; rather, they are "accumulated" particles. The elementary particles released during the decay of a "white hole" create pressure, which we perceive as energy throughout the cosmic tetrahedron.

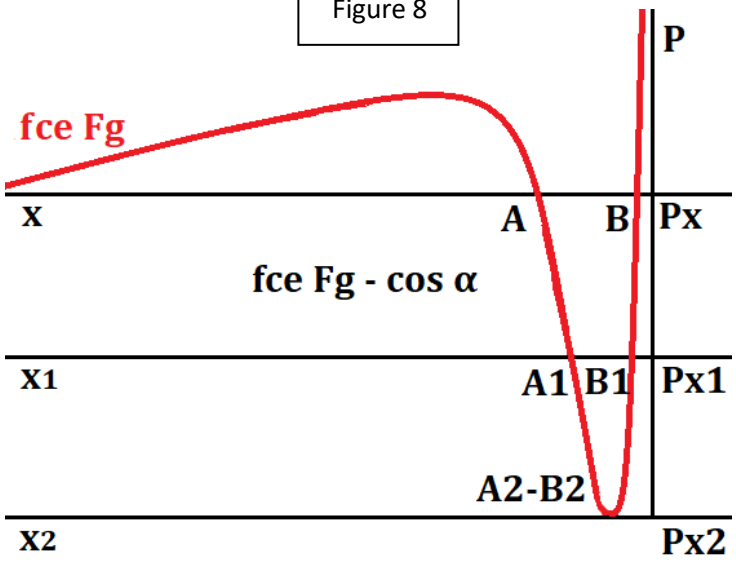
7.2. Material bodies

Material bodies consist of solid particles, such as protons and electrons, surrounded by a shell of condensed energy (see 6.5).

7.2.1. Condensation of energy

Energy is not only condensed at the edges of material bodies, as stated in the previous chapter. This is merely the outer shell of the molecular world. Condensation occurs up to the surface of solid particles, namely protons and electrons. As we know from chapters 6.5.1 and 6.5.2, condensed energy exerts a repulsive force on surrounding bodies, whether solid or material. Approaching a proton or neutron requires an immense force, which can be conceptualized only within the context of enormous vortices of energy in the space of the cosmic tetrahedron, often occurring in the center of stars. An interesting situation arises around each solid body, expressed by the atomic function **„f_a“** according to the following formula:

Figure 8



$$f_a = F_\vartheta - F_p \cdot \cos a$$

where:

- F_ϑ is the force according to Newton's law of gravitation, by which bodies are attracted to each other (as shown in the diagram of the function **fce Fg**),
- F_p is the force of condensed energy pressure acting outward from the solid body into space (as shown in the diagram of the function **fce A**),
- $\cos a$ is the cosine of the angle at which this force acts from the solid body.

7.2.2. Diagram illustrating the relationship

To improve understanding, the entire situation is illustrated in the above diagram. The gravitational force function **fce Fg** increases toward the surface of the nucleon „***p***“ up to point „**A**“,which is shown on the x-axis. The gravitational force increases according to Newton's law of gravitation.

At point „**A**,“ the gravitational force equals the repulsive force caused by the condensed energy surrounding the nucleons. At this distance, electrons are present within the atom.

If objects approach the nucleus, the repulsive force pushes them back to the distance of point **A**. Conversely, if the objects are moved further away, the gravitational force presses them back to the same distance. Between points **A** and **B**, the repulsive force greatly exceeds the gravitational force. Objects within this zone would be expelled from the atom at high speed.

The distance from point **A** to the surface of the nucleon can be considered as stable, while the distance to point **B**, where gravitational and repulsive forces are again in equilibrium, can be termed as "unstable." Objects located between the surface "**p**" and point **B** are pushed towards the surface of the body by the energy pressure (according to Newton's law of gravitation). Nucleons are entirely passive bodies that do not possess any intrinsic forces; their involvement in the process is solely due to their impermeability to energy.

If an ideally flat object were placed on an ideally flat surface of a nucleon, it would not be possible to separate it from the nucleon. The angle $\boldsymbol{\alpha}$, at which the repulsive force would spread, would be 90º, meaning that the force would act solely from the side. In this case, the ***cosine*** of $\boldsymbol{\alpha}$ would be zero ($\boldsymbol{cos}\ 90° = 0$), which would make the negative part of the equation zero. Thus, only the gravitational, or attractive, force would exist. However, nucleons are not flat objects, which leads to an interesting and logical situation around the atomic nucleus, as described in the conditions (1.2.).

Along the **X**-axis, we can observe the following: Given the size of the atomic nucleus, the stable sphere where point **A** is located is very far away, while the "labile sphere" of point **B** is very close to the surface of the atomic nucleus.

For a better perspective: *Given the very small size of nucleons (the diameter of a proton is approximately 8.4×10^{-15} meters), we can imagine them on a larger scale. If a proton had a diameter of about 1 meter, the stable sphere around the proton, where point **A** is located, would be on the order of billions of kilometers away. Conversely, the labile sphere, where point **B** is located, would be approximately a fraction of a millimeter from the surface of the proton.*

These ratios explain and are mathematically derivable reasons why an atom is actually an empty structure, why two protons cannot hold together, why a neutron must decay into a proton and an electron, and why up to four nucleons can form a larger stable nucleus of an atom.

7.3. Structure of the atom

As stated in the scientific literature, the atom consists of a nucleus and electrons.

7.3.1. The force ratios of energy around nucleons

These ratios do not allow the existence of any additional solid bodies between sphere **A** and **B** (see 7.2.2). From the surface of the nucleon, they allow the existence of solid bodies only before the labile sphere **B** and beyond the stable sphere **A** (see Figure 8). This means that all solid bodies are either pressed against the surface of the nucleons or pushed away by the force of condensed energy up to a distance bounded by the stable sphere **A**.

The simplest atom, such as hydrogen, represents a model of such a situation. The nucleus of the atom consists of one proton, and the electron can only approach it up to the edge of sphere **A**. Between the nucleus and the electron is only condensed energy, which prevents the electron from getting closer. If this region of condensed energy is disturbed by pulsating energy from outside, the electron will start to oscillate, moving on the level of condensed energy of the proton.

7.3.2. Electron

Electron, regardless of its shape, represents a material particle of a solid body. Due to its small size, the repulsive force, which is approximately as strong as that of the proton, is greater than the gravitational force at all points along the **X**-axis. The dominance of gravitational force occurs only at a distance where its influence becomes negligible. Current hypotheses speak of a "negative charge," which means that two electrons cannot form an atom.

7.3.3. Atom

An atom is a structure consisting of a nucleus (composed of protons and neutrons) and electrons. Electrons move along the energy density level around the atom's nucleus and touch this energy density with their own shell. If an electron moves away, it is again pressed back to this level by gravitational energy. If an electron is pushed closer by some anomaly, it is again repelled by the energy density of both the nucleon and the electron.

7.3.4. Neutron and its decay

A neutron is not a stable nucleon; when isolated, it decays into a proton and an electron. If conditions exist for its decay, reciprocal physics must also account for the opposite conditions for its formation. This formation can be derived from the formula $\boldsymbol{m = e^2 / c}$. Its formation therefore assumes conditions that likely involve larger assemblies of neutrons and protons, where level B is further from the atomic nucleus surface and does not result in its ejection from the nucleus.

7.4. Nucleus with multiple nucleons

In the space of the cosmic tetrahedron, where forces act from all directions, there is a tendency for bodies to cluster into spherical shapes. This principle also applies to nucleons.

7.4.1. More complex atomic nuclei

More complex atomic nuclei are composed of more nucleons. Theoretically, a nucleus cannot be formed from two protons because they would align in a line and both protons would be immediately expelled by the compressed energy. Less labile is the deuterium nucleus, composed of a proton and a neutron, where a slightly different shape of the nucleus than a line can be assumed, allowing for its stable existence. Similarly, in the case of tritium, where the atomic nucleus forms a plane, the nucleus is also unstable due to the effects of compressed energy (of course, assuming the validity of geometric laws).

7.4.2. The solid nucleus of a helium atom

The solid nucleus that meets the conditions of space is the nucleus of a helium atom. This nucleus forms a tetrahedral shape composed of four nucleons (two protons and two neutrons) and is formed through atomic reactions of hydrogen isotopes. It is not possible to construct a more ideal body from four nucleons than the nucleus of a helium atom.

7.4.3. Mass ladder of atomic nuclei

When four nucleons combine to form an atomic nucleus, an interesting situation arises. The atomic nucleus is lighter than the sum of the masses of the individual nucleons. This phenomenon, known as the mass ladder of atomic nuclei, is not fully explained by conventional physical hypotheses.

The mass ladder arises in the following way:

- The mass of each nucleon consists of the mass of the nucleon itself and the mass of the surrounding shell of condensed energy. When four nucleons merge into a single nucleus, the surface area of the newly formed nucleus is smaller than the sum of the surfaces of the free nucleons (see 9.2.1). The excess energy escapes, for example, in the form of an atomic explosion, and reduces the mass of the newly formed body. As the nucleus grows with new nucleons, there must be a continuous increase in the mass gaps of the atomic nucleus. **This gap represents the mass of the condensed energy that is no longer present in the shell of the atom and cannot be present according to mathematical laws.**

7.5. Instability of larger nuclei

Constant enlargement of the atomic nucleus with new nucleons causes the nucleus to become imbalanced, which can more easily disrupt the nucleus's stability and the formula $\boldsymbol{p \cdot c = konst}$. This phenomenon occurs for the following reasons:

7.5.1. Influences on the envelope of condensed energy

External influences primarily affect the envelope of condensed energy and often cause vibrations of the upper layer of condensed energy due to pulsing energy (such as light). This, in turn, causes vibrations of the electron regardless of its nature. However, this influence does not affect the nucleus of the atom itself.

7.5.2. The phenomenon of mass and the surface of the nucleus

The phenomenon of mass is derived from the surface area of the nucleus. Nucleons inside the nucleus do not participate in this phenomenon and can float in a kind of energetic soup without binding to their surroundings. The pressure of condensed energy affects only the surface of the atom's nucleus, which has variable size and shape, especially when some nucleon is missing or extra in its otherwise ideal spherical shape. However, the fact remains that the stable spheres **A** and **B** move closer to each other as the nucleus grows, so the repulsive force of condensed energy can be smaller even if the nucleus is more labile. It may happen that a neutron breaks the labile nucleus and releases the condensed energy soup inside the nucleus, for example, in the form of a nuclear explosion. However, we do not know the shape of the neutron, its condensed energy envelope upon leaving the nucleus, or the exact mechanism of its entry into a neighboring atom, and so on. Therefore, the situation can occur in various ways with varying probabilities.

7.5.3. Stable nuclei and their formation

Changes in the shape of an atom's nucleus in larger nuclei lead to such instability that the nucleus itself decays into isotopes until it reaches an atom with a nucleus that forms an ideal sphere (if this term can be used). At this point, the decay stops, and a stable nucleus is formed, with this process occurring within the conditions of the cosmic tetrahedron. Nuclei that are now considered unstable must have originally formed under conditions where they were stable (otherwise, they could not have formed). This means that dating the formation of the Earth based on the decay of uranium to lead is misleading; the decay of these elements actually began only after the conditions of their formation and stability had ended, not at the moment of Earth's formation.

7.6. Shape and Properties of Solid Bodies

We know very little about the shape and properties of solid bodies, such as protons. Information about their surface, whether it is solid or elastic, and the differences between the surface of a neutron and the surface of a proton or electron, is derived only from their manifestations, which are difficult to capture.

7.7. Size of the nucleus and black holes

If the size of the atom's nucleus exceeds a certain limit, then at all points the distance from the nucleus's surface, where the gravitational force $\boldsymbol{F}$ is greater than the repulsive force, as shown at point $\boldsymbol{A_2 = B_2}$ on the $\boldsymbol{x_2}$ axis diagram in Figure 8. In this case, all bodies fall from any distance to the surface of the atom's nucleus, which is currently referred to as a "black hole."

8 Magnetism

Magnetism is a phenomenon that arises from the direction of energy flow while maintaining equilibrium with the surrounding energy environment.

8.1. The basis of the phenomenon

The basis of magnetism is the directed flow of energy, while maintaining the relationship $\boldsymbol{p \cdot c = konst}$. (see 2.2). There is no change in energy conditions, only a change in the direction of most of the energy. There are two possibilities for the occurrence of this phenomenon:

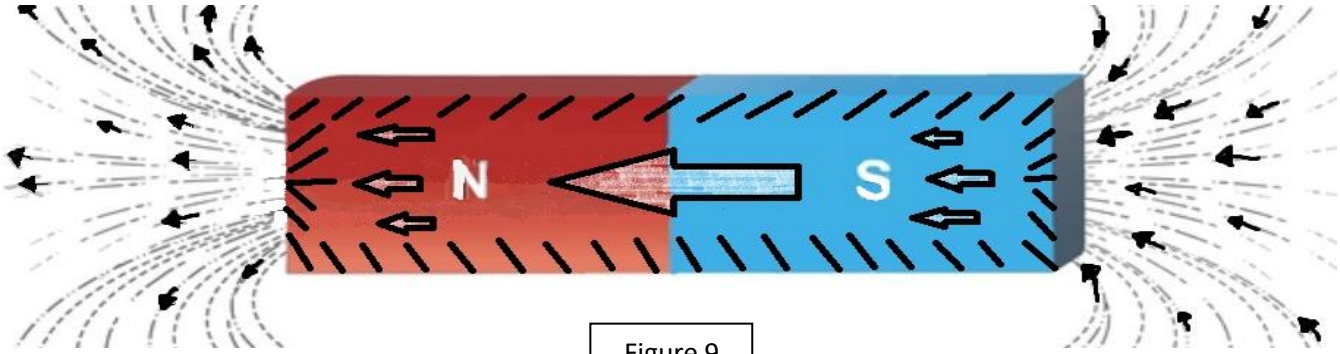


Figure 9

8.1.1. A permanent magnet

One case of the emergence of magnetism is a static phenomenon that occurs in ferromagnetic materials. Figure 9 shows a model of such an energy rectifier (magnet). By magnetizing a rotating elongated ferromagnetic material, the electron levels are shifted in one direction.

Let's imagine atoms simplified as flat disks, which are tilted in one direction, just like in Figure 9. This makes them passive energy rectifiers. Although a material body is practically empty for the propagating energy, and most of the energy passes through without significant contact with its particles, a small portion of the energy is deflected from its direct motion. This deflected energy is then directed in alignment with the orientation of the atomic levels, creating the phenomenon of magnetism.

If we want to understand the phenomena around a magnet, we must recognize that the magnet acts as a passive obstacle in the path of propagating energy (see chapter 4). Its main function is to direct part of the energy in one direction. Considering this, we can use vector calculus to analyze how energy passes through the body and how it bypasses it. In this way, we can easily understand why magnets with opposite poles attract while magnets with the same poles repel. Mathematical-logical methods and calculations lead to the determination of curves known as field lines, which help us understand the meaning of the positive and negative poles of the magnet and other related phenomena.

8.1.2. Electromagnet

Another way to create the phenomenon of magnetism is through the influence of the active component of electric current, which creates a space with conditions where $\boldsymbol{p \cdot c \neq konst}$., even though in other areas $\boldsymbol{p \cdot c = konst}$. This results in the electromagnetic phenomenon. This phenomenon, known as electromagnetic, is thus the result of directing the flow of energy in one direction due to electric current.

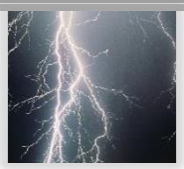
8.2. Principle of directing energy

The principle of directing energy is not limited to ferromagnetic materials. All materials that have surfaces causing the reflection of spreading energy, provided they are not perfect spheres, possess this property. Practically, this includes all materials, and various cases of paramagnetic and diamagnetic are derivable within this system and do not require special discussion. Although magnetism may initially appear to be a strong phenomenon, in reality, only a small fraction of spreading energy is directed.

The notion that magnetic force is a product of the magnet itself is, however, unusable for mathematical and logical procedures. After several steps of systemic analysis, it becomes apparent that we encounter a contradiction with the law of conservation of energy. A magnet, for instance, can repel another magnet for billions of years and overcome gravitational force without any demonstrable transformation of energy. The creation of force without any expenditure of energy has not been proven, and technical fields do not work with such hypotheses.

Note: *In academic circles, there are a variety of opinions on the nature of magnetism. Some scientists hold the view that magnetism is the result of elementary particles, where one half has a positive charge and the other half has a negative charge. Others focus on the alignment of electron levels or on separating the positive and negative parts of a single elementary particle. There are even speculations about some mysterious force.*

9. Electricity



Electricity is a phenomenon arising from the directed flow of energy in a non-equilibrium state of energy in the surroundings.

This phenomenon is closely related to magnetism, but unlike magnetism, it involves a non-equilibrium state where $\boldsymbol{p \cdot c \neq konst}$. Non-equilibrium with the surroundings can occur in two ways:

9.1. Higher energy speed

Imbalance can occur at higher speeds of **"energy c"**. This can be achieved in accelerators like a dynamo. By mechanical movement, such as rotor rotation, rotating magnetic fields, or the movement of a magnet in space, the directed energy is accelerated. In other words, mechanical movement adds additional energy that increases the speed of its flow. Methods of generating electricity are detailed in the technical literature, so we will not further discuss them here.

9.2. Higher energy density

Imbalance can also arise from higher density of **“energy p”**. This method of electricity generation, the most common in nature, is known as static electricity. The principle of this phenomenon is not well understood in current hypotheses, so it needs to be explained in more detail.

9.2.1. Static electricity in thunderstorm clouds

To understand this principle, a good example is the generation of static electricity in thunderstorm clouds. As water droplets merge into larger droplets, the geometry of these bodies changes. When two droplets of the same size merge into one, the new object has the same volume as the original droplets, but its surface area is 20% smaller than the sum of the surfaces of the two droplets before merging. On the surface of these bodies, energy is compressed (see sections 2.6, 6.5, 7.2). The reduction in surface area during the merging of droplets creates an imbalance of energy in the surroundings. If this process occurs rapidly, energy can be released in the form of lightning.

9.2.2. General Principle of Static Electricity

This principle applies to the formation of any static electricity. **Whenever there is a change in the size of the area where condensed energy is maintained, an energy imbalance in the surrounding environment occurs. This phenomenon is then referred to as static electricity.**

Note: *These phenomena can be observed, for example, with the friction of plastic materials, such as polyethylene, which heats up and generates static electricity. Similar phenomena occur with other materials, even if we do not immediately notice them. A striking example is a volcanic eruption, where rising smoke cools rapidly, particles shrink, and the volcano's crater is surrounded by lightning and other phenomena typical of static electricity.*

9.3. Repetition of the Principle on Different Levels

This simple principle repeats at all levels. When the surface changes, energy is always released. When atoms combine, the reduction in surface area and the rapid release of energy is called an atomic reaction. When molecules combine, the released energy due to the reduction in surface area is referred to as a chemical reaction. Energy release due to cooling is then called static electricity. The system of reciprocal physics does not recognize and cannot use other means of energy release without conflicting with objective physical laws (except for point 9.9).

9.4. Conductors and Insulators

Materials can be divided into conductive and non-conductive, commonly known as conductors and insulators.

9.4.1. Conductors

Conductors are materials whose structure and arrangement of molecules allow for efficient transmission of energy in the form of electricity. These primarily include metals, which not only conduct electric current well but, in some cases, such as iron, nickel, or cobalt, also possess the ability to be magnetized and are classified as ferromagnetic materials.

9.4.2. Insulators

Insulators are materials whose structure and arrangement of molecules prevent the effective transmission of electrical energy. These materials are used to separate electrical conductors and to prevent unwanted leakage of electric current. Common insulators include materials such as plastic, glass, ceramics, and rubber.

9.4.3. Semiconductors

Semiconductors are materials whose molecules can occupy only a single position that allows for the conduction of electricity. If electricity flows in the opposite direction, the molecules cannot assume a position that makes the material sufficiently conductive for electricity.

Unlike pure conductors and insulators, semiconductors can change their conductivity, making them suitable for use in various electronic devices such as diodes, transistors, and integrated circuits.

9.5. Batteries and accumulators

Batteries and accumulators utilize the principle mentioned in sections 9.2.1 and 9.2.2. In this case, it involves a chemical reaction resulting in a change in the size of the surface of objects, usually molecules (see section 11.4).

9.6. Combination of Imbalances

Both types of imbalances **($\boldsymbol{p \cdot c \neq konst.}$)** usually contribute simultaneously to the generation of electricity. It is typically not possible to precisely determine the exact contribution of each component to this phenomenon.

9.7. Possible Change in Constant

Imbalance can also be caused by a change in constant. This phenomenon is difficult to observe on Earth, but it might have significant effects in distant space. The spreading energy may enter an area with a different density of the constant, which can affect all objective natural laws. In the space of the cosmic tetrahedron, vortices of energy can form, leading to the creation of solid and material bodies, contributing to the formation of planets, stars, and galaxies (see Chapter 3).

10. Time

Time is a phenomenon that represents the "perception" of the interaction of energy, which "interweaves" with material bodies in the space of the cosmic tetrahedron.

This phenomenon plays a key and irreplaceable role in this space.

10.1. Mass and velocity

According to Einstein's theory of relativity, the change in the mass of a body depends on its velocity (see Chapter 4.2). If a massive body were to move at the speed of light, its mass would become infinite. This would result in the Earth being bombarded by particles, such as neutrinos, with infinite mass, disrupting the

balance of matter and energy in the universe according to Einstein's theory. At this point, the indispensable role of the phenomenon of time comes into play.

Note: *If we assume that any massive body moving at the speed of light would, according to Einstein's formula, have infinite mass, this mass would surpass the entire existing mass of the universe. This would lead to infinite gravity at every point in the universe. Particles of energy (whether called gravitons, quarks, neutrinos, or otherwise) move at the speed of light in this model, as they are essentially light itself. The idea of myriads of these particles, each with infinite mass, constantly impacting us is unimaginable. Moreover, as mentioned in Chapter 1.2.2, technical fields cannot work with the concept of infinity. However, this model remains functional even without this abstract concept.*

10.1.1. Lorentz Transformation of Time

Before deriving Einstein's theory of relativity **(fce_{Ein}),** Dutch physicist Hendrik Antoon Lorentz, based on measurements of the speed of light, derived the so-called "transformation of time" **(fce_{Lor}).** This principle is described in detail in specialized physical literature and can also be derived in the "reciprocal physics" system in a manner similar to that in Chapter 4.2. If only the Lorentz transformation of time were valid, it would lead to a disruption of equilibrium in the universe. Albert Einstein realized that if the Lorentz transformation of time holds, then the model of relative mass, known as the theory of relativity, must also be valid. This theory is now generally accepted in terms of the correctness of calculations, although its interpretation may vary and its full understanding is not always straightforward.

10.1.2. Model of Reciprocal Physics

In the model of reciprocal physics, we do not focus on the relative motion between individual bodies but on the velocity of a body relative to the cosmic tetrahedron in which all events occur. This approach allows us to derive various applications, such as the "change in the phenomenon of mass" depending on the velocity of the body in space. The entire situation can be expressed by the formula:

$$m = m_0 \cdot fce_{Ein} \cdot fce_{Lor} = m_0$$

This formula applies to any velocity of a body in space.

It is interesting to **note that Einstein's relativity formula lacks "time,"** whereas **Lorentz's time transformation lacks "mass."** This difference in the approach to these fundamental physical quantities is worth considering and may suggest how each theory addresses the fundamental aspects of relativistic behavior in space and time.

10.1.3. Consequences of Lorentz Time Transformation

Without Lorentz time transformation, even at today's much lower velocities, there would be significant unexplained excesses of mass. This principle ensures that no mass or time discrepancies or excesses occur. Both functions, which complement each other, allow us to better understand phenomena both in the universe and at the atomic level. Like Lorentz time transformation, Einstein's theory of relativity represents only parts of a more complex formula (see Chapter 4.2.2). Ignoring this fact can lead to bizarre conclusions that appear in speculative literature, often presented as "scientific."

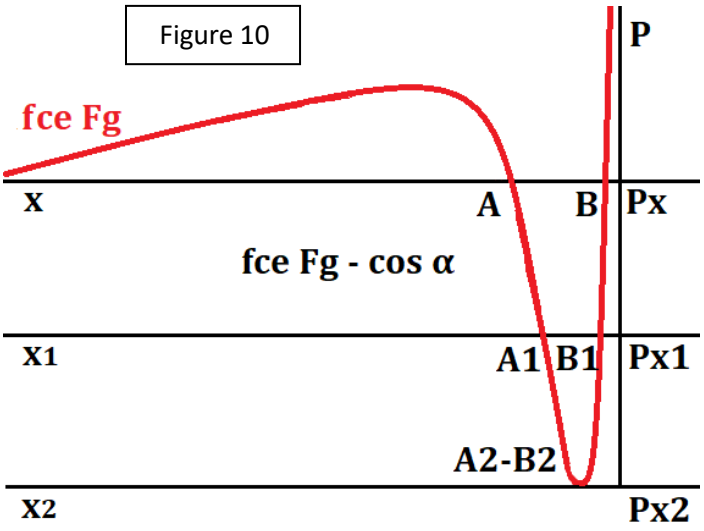
10.2. Conclusion from Lorentz Time Transformation

The Lorentz time transformation shows that time is independent of the existence of bodies, even though bodies are the only substance capable of perceiving and measuring time. Where there is no movement of energy, the phenomenon of time does not arise.

11. Chemical Phenomena

Chemical reactions follow the same principles as nuclear reactions. Although chemical phenomena are not considered physical in science, in reciprocal physics, they are based on the same principles. The differences between them are as follows:

Figure 10



11.1. Dependence on the shape of the nucleus and the atom

Nuclear reactions depend on the shape of the atomic nucleus, while chemical reactions depend on the shape of the entire atom.

11.2. Change in concentrated energy

Nuclear reactions result from changes in the amount of concentrated energy from the surface of the atomic nucleus **to the region of sphere "A"**. This sphere is the area where the repulsive force of concentrated energy outweighs the gravitational force. In contrast, **chemical reactions** are the result of changes in the amount of concentrated energy **beyond the region of sphere "A"** (see Figure 10), where the gravitational force prevails over the repulsive force of concentrated energy.

11.3. Mass gaps

Similar to nuclear reactions, mass gaps also occur in chemical reactions (7.4.3.). Since this involves the release of energy beyond sphere **"A,"** where the energy density compared to the region between spheres **"A"** and **"B"** is minimal, the mass gaps are difficult to measure with our instruments.

11.4. Reversibility of chemical reactions

Many chemical reactions are easily reversible, allowing for energy storage. By altering the chemical composition, energy can be either added or removed, for example, in the form of electricity or heat (as in batteries or fuels) (9.5).

12. Biological Phenomena

12.1. Biological phenomena and reciprocal physics

Although biological phenomena are not commonly regarded as physical, they are based on the same principles of nature as physical and chemical phenomena. Within the framework of reciprocal physics, it is

possible to analyze biological processes such as photosynthesis, chlorophyll activity, digestion, brain function, and nervous activity, even assuming Einstein's theories are valid. These biological phenomena can therefore be derived from these fundamental principles of physics.

For example, the essence of photosynthesis, digestion, and brain function, including reasons why the gray matter cortex must fold during its activity and why higher animals develop brain convolutions, can theoretically be explained by this model. However, most other conclusions about biological processes remain at the level of hypotheses and speculations. While some current hypotheses can be ruled out, new possibilities for interpretation arise in the field of science, not in engineering.

12.2. Low Probability of Abiogenesis and Its Implications

However, I would like to provide at least one very interesting probability estimate. When considering the probability of life originating through abiogenesis, some estimates suggest numbers in the range of $\mathbf{10^{-20}}$ to $\mathbf{10^{-40}}$. This indicates that the probability is very low.

For example, using a conservative estimate of $\boldsymbol{P_{Life} \approx 10^{-20}}$ to $\mathbf{10^{-40}}$, the probability would be approximately $\mathbf{1}$: $\mathbf{10^{20}}$ which in computing terms is roughly equivalent to $\mathbf{1.25 \times 10^{19}}$ bytes or **12.5** billion terabytes.

It is left to the reader to determine whether and how the essence and purpose of life in the universe can be discovered, as current science is not progressing in a way that would provide such information.

12.3. A special view on brain function

The view of brain function from the perspective of reciprocal physics is particularly interesting. This model explains the necessity of brain convolutions in higher animals and suggests that these structures have a specific function related to the efficient processing and directing of energy. The essence of digestion and photosynthesis within this model is based on the same principle, though they employ different mechanisms.

12.4. The principle of life and its variations

The model does not suggest that the principle of life depends on specific chemical elements such as water, oxygen, or carbon. It is possible that in different parts of the universe, life forms based on other elements or compounds exist. Essentially, in this model, life is understood as an "energy accumulator," meaning that the principle of life is universal and independent of specific chemical compounds.

13. Addressing Some Objections

It is interesting to consider the difficulties associated with perceiving and evaluating a physical model based on Einstein's principles and theories (Chapter 1). Strict adherence to the relationships between mathematical and natural laws is often unusual and difficult to understand in current physical hypotheses, making these principles challenging to accept in the current state of science. In the following text, we will focus on some fundamental objections to the model of reciprocal physics.

13.1. Typical objection

One of the most common objections is the question: ***"Where does the energy come from that acts from all sides and in all directions to create the phenomenon of gravity?"***

Answer: The number of energy sources and their characteristics in the universe can be inferred through mathematical and logical methods based on existing knowledge. However, measurements and calculations needed for a more precise determination of their locations have not yet been carried out. The localization of these energy sources will be possible only after gathering the necessary information and conducting a thorough analysis. Currently, science is not progressing in this direction.

When focusing on the origin of this energy, it is logical to assume that it must have a source; in other words, something or someone must have created it.

13.2. Feynman's gravitational rain

Another objection concerns the passivity of the model and was raised by Nobel laureate Richard P. Feynman. In the 1965 edition of *Lectures on Physics*, Feynman stated: ***"As the Earth moves around the Sun, it should encounter more particles coming from the front side than from the back side (similarly to when running in the rain, where the rain is more intense on your face than on the back of your head). Therefore, the Earth would stop due to this resistance. The mechanism of gravity in such a system cannot work."***

Answer: When describing gravity as a "rain," Feynman overlooked a key aspect—the curvature of spacetime, which affects the interaction of gravitational particles. When Feynman referred to gravitational "rain" and compared it to rain falling on a running person, he assumed that Earth's motion creates resistance in the form of particles colliding with it. However, this concept completely disregards the curvature of spacetime caused by Earth's motion relative to energy particles.

In reality, according to general relativity, the motion of a body in curved spacetime causes gravitational particles (or their equivalent) to be directed by this curvature, effectively eliminating the "rain" effect as resistance.

Instead of Earth's motion leading to its deceleration due to resistance, spacetime curvature redirects particles in alignment with that curvature, preventing any braking effect. In this context, the curvature of spacetime acts to direct and "filter" gravity, altering how gravitational forces influence Earth.

Had Feynman accounted for the curvature of spacetime, he would have realized that gravity is not "resistance" opposing a body's motion but rather an integral part of the dynamics that guides the body in accordance with this curved geometry.

13.3. Objections concerning gravitational pressure

Some objections focus on the issue of gravitational pressure, for example: ***"If external gravitational pressure acted uniformly at every point and direction, according to Pascal's law, two bodies immersed in a fluid should press against each other. Such a phenomenon does not occur, however."***

Answer: This objection is incorrect. We actually observe such phenomena. It can be demonstrated with a simple experiment: if you throw a stone into the sea, it sinks to the bottom without stopping. This indicates that bodies in fluids (such as the stone and the seabed) are subject to gravity. Gravity operates not only in solid materials but also in liquids and gases, where its effects can be measured and observed. This example shows that even in a liquid environment, there is a gravitational force that is consistent with the principles of reciprocal physics.

13.4. Medieval notions of solidity and impenetrability

Some objections stem from medieval notions of the solidity and impenetrability of bodies.

13.4.1. Dependence of Force on the Orientation of Bodies

Objection: ***"The force between irregular bodies depends on their orientation. A cylindrical satellite would be pushed towards Earth depending on its orientation, which contradicts current measurements."***

Answer: This argument is based on the incorrect assumption that geometry alters the fundamental properties of physical particles. As was clearly demonstrated in the early 20th century, bodies are composed of atoms, and atoms are made up of nucleons. Surprisingly, nucleons, which we might consider as tiny spheres, are completely impervious to energetic influences. Therefore, when you rotate your cylindrical satellite, its components (nucleons) remain stationary, and their surfaces do not change. In other words, geometric spheres, no matter how you rotate them, will remain in their spherical state, which is surely a disappointment to those who thought that simply rotating spheres might make them look different.

13.4.2. Gravitational Force and the Geometry of Bodies

Objection: ***"Two wooden spheres will be pushed together with the same force as two similarly sized lead spheres because gravitational force does not depend on their geometry. This contradicts all current measurements."***

Answer: This objection overlooks the fascinating fact that gravitational force relates to mass, not surface area. As revealed in the early 20th century, bodies are composed of atoms, and atoms are made up of nucleons. Surprisingly, nucleons, which can be considered tiny spheres, are completely impermeable to energy. So, while a lead sphere contains many more of these tiny "spheres" than a wooden sphere of the same size, its gravitational force will be significantly greater. When measuring gravity, you need not worry about the geometry of the spheres causing any issues. The lead sphere will produce a much stronger gravitational effect than its wooden counterpart, all due to its "fully charged" nucleons that make up its core.

13.4.3. Criticism of Medieval Notions

"Each of these two objections is sufficient to call into question such a gravitational law."

Answer: It is interesting that Czech and Slovak science still adheres to medieval notions of matter, which have long been surpassed. Technical disciplines, on the other hand, rely on established facts and practical knowledge. The question of the absolute impenetrability of material bodies to gravity (13.5) essentially remains at the level of belief. If objections 13.4.1 to 13.4.3 were valid, we would have to accept that everything stops at the imaginary walls of a body. Bodies could not be transparent, and no rays, electrons, or other particles could pass through them. Thus, it is evident that the current understanding of gravity and matter is much more sophisticated than what medieval views offer.

13.5. Distribution of Energy into Kinetic and Potential

Objections regarding the division of energy into kinetic and potential often include arguments such as: ***"Two bodies influenced by gravity (e.g., Earth and the Moon) have a certain amount of energy, which is the sum of their kinetic and potential energy. No work is done because the gravitational force acting on the body is perpendicular to its path in every case, and thus no energy is expended."***

Answer: Of course, the division of energy into kinetic and potential is so fundamental that it is involved in nearly every physical consideration, although no real evidence of its validity has yet been presented. In the context of Reciprocal Physics, however, it is a completely different story. Here, we rely on a single type of energy, which not only simplifies the entire model but also spares us from complications with excessive

distinctions between different types of energy that somehow do not correspond to reality. It is fascinating how some theories try to complicate matters where a simple explanation is much more elegant and faithful to the true laws of nature. (1.2., 1.4.)

13.6. Conflict Between Einstein's Theories and Quantum Physics

Some objections focus on the alleged conflict between Einstein's theories and the hypotheses of quantum physics. For example, there is an argument: ***"With all due respect to Einstein, it cannot be ignored that his theories are in conflict with Feynman's and Heisenberg's quantum physics."***

Answer: This opinion is a typical example of intellectual audacity. The real "conflict" is not between Einstein's theories and quantum physics as such, but between these theories and the philosophical views of their authors regarding the nature of reality. Quantum physics, as we know it, contains elements that function as completely unnecessary embellishments in the Reciprocal Physics system. It's like trying to fit unnecessary components into a perfectly functioning machine—the result is chaos. Consequently, quantum physics comes into conflict with Einstein's theories, with the "conflict" being more a confusion arising from redundant hypotheses than from objective reality. The variety of quantum physics models that could be developed does not mean they are useful. While we can respect the views of Nobel laureates, their claims are not sufficient to undermine Einstein's theories without objective evidence.

13.7. General objections

Some objections concern general principles and may take various forms. For example:

13.7.1. Newton's and Kepler's laws

It is fascinating how Newton's and Kepler's laws are used as a magical formula to support the current physical system. Although contemporary physics is unable to derive these laws purely through logical-mathematical methods, they suddenly become an infallible argument for the validity of the current system. Truly remarkable!

It's almost as if these laws have a magical power to validate all possible hypotheses, regardless of whether they can be logically and mathematically derived. Perhaps we should marvel at how all alternative theories that do not fit this "golden standard" are automatically dismissed. If it were that easy, we could easily confirm all physical hypotheses simply by comparing them to Newton's and Kepler's laws—regardless of the fact that each physical model can find its own interpretation.

13.7.2. Astrophysical Argumentation

In the current astrophysical debate, arguments often stem from hypotheses and concepts typical of modern physics. In Reciprocal Physics, where terms like "gravitons" are replaced by the simpler term "energy," we avoid the complicated and sometimes unclear concepts used by contemporary physical models.While modern astrophysics introduces new terms like "quarks" for tiny particles of matter, Reciprocal Physics uses a single type of energy to explain all natural phenomena, simplifying understanding and eliminating terminological confusion.

Measurements and observations in astrophysics are not in conflict with logical and mathematical laws, as some current theories suggest. Instead, conflicts arise from ambiguities and inconsistencies between different theoretical approaches. Reciprocal Physics focuses on clear and consistent explanations of phenomena without the need for complicated and often empty terms like "potential" or "kinetic" energy. This avoids the unnecessary chaos resulting from excessive use of complex and unverified concepts.

13.8. Conclusion on Reciprocal Physics

No evidence has yet been presented that effectively challenges Einstein's theories and, consequently, Reciprocal Physics. This model, based on strict consistency between mathematical and natural laws, remains unshaken by objections. To disprove Reciprocal Physics, objective evidence disproving the foundations of Einstein's theories would be necessary, which has not yet been achieved.

14. Conclusion

14.1. Speculative nature

As stated in the introduction, this treatise presents a model based on assumptions about the validity of mathematical and natural laws, including Einstein's theories. This text is a speculative work, and its conclusions hold only within the framework of these assumptions. Like many other speculative theories that rely on various hypotheses (such as the infinity of the universe, the Big Bang, mutual attraction of bodies, or the redshift of spectra as a result of the movement of bodies in space), which are commonly found in both scientific and popular literature, they present their conclusions as irrefutable truths, even though they are based on uncertain foundations (see chapters 3.4., 3.5.).

It is intriguing to ask why the "Reciprocal Physics" model continues to be rejected by modern science. How is it possible that even after the discovery of atoms and nucleons, medieval concepts of matter composition still persist? Why is it ignored that Einstein's general relativity formula has three forms, yet only one is acknowledged (see chapter 3.3.5.)? And why is only one possible cause for the "redshift of the spectrum" considered, while other possibilities are overlooked (see chapter 3.4.)?

14.2. Critique of science

These questions suggest that modern science sometimes appears to be trapped in older paradigms and philosophical approaches that should have long been discarded. It's interesting to reflect on these questions, even if it may divert us from a purely engineering perspective.

It seems that science is beginning to resemble religion in its confusion and reluctance to change. How else can one explain that, in the first half of the 21st century, there is still reliance on medieval notions of material bodies (see chapters 13.4.1, 13.4.2, 13.4.3), despite the discovery of atomic structures? It’s fascinating that many branches of physics have developed like isolated islands, without regard for their mutual interactions.

In ancient and medieval times, religious dogmas were the link between these fields, and it appears that this tradition persists in some areas even today. When looking at the "objections" from academic circles, it seems that the scientific community sometimes falls into a kind of intellectual inertia, where arguments and theories often do not differ much from the old superstitions one would expect from a medieval alchemist rather than from modern science.

14.2.1. Adoption of Foreign Proposals

The objections that arise are mostly adopted from various foreign publications and statements by foreign experts. Our own scientific contributions in this regard are lacking. This suggests that the opinions of foreign experts are often accepted as dogma without being critically evaluated in the context of actual reality.

14.2.2. Problems with Accepting Foreign Opinions

Objections that frequently arise are mostly taken from various foreign publications or statements by renowned experts from abroad. It seems that our own scientific work in this area is inadequate or entirely lacking. This suggests that the opinions of foreign experts are sometimes accepted as unwavering dogma without being subjected to critical evaluation in the context of current reality. Perhaps we should reconsider whether we are merely relying on citations from foreign sources in our scientific work without examining what is truly happening.

14.2.3. Philosophical Problems and Scientific Inaccuracy

Philosophy based on religious principles presents problems that science has still not managed to overcome even after centuries. Every inaccuracy and erroneous conclusion creates additional errors that spread like a domino effect. These errors can be uncovered through systematic analysis, which helps identify inconsistencies in individual steps. For example, the belief in the "infinity of the Universe" led to the hypothesis of the "Big Bang." This hypothesis turns out to be incompatible with Einstein's general theory of relativity, indicating the need to reassess its conclusions. As a result, new forces and concepts are introduced that disrupt the conservation of energy law and lead to explanations that verge more on mysticism than scientific rigor. (1.2, 1.4)

14.2.4. Adapting Natural Laws to Hypotheses

In religious systems, we often see an effort to adapt natural laws to support a defended hypothesis, a trend that has persisted for centuries. This approach involves a reluctance to question certain facts and ignoring others. For example, the "redshift of spectra" is commonly interpreted as evidence of the expanding universe, while three possible factors for its origin are overlooked (3.4). If we acknowledged that there are various possibilities for the origin of redshift, the "Big Bang" hypothesis could face difficulties, potentially shaking the fragile structure of current theories. This approach leads to hypotheses becoming sacred cows that resist any criticism, even if it means ignoring alternative explanations.

14.2.5. The rejection of Einstein’s theories by their proponents

It is unrealistic to expect that the reciprocal physics model based on Einstein's theories will gain support from those who believe in the incorrectness of these theories. Some prominent scientists have already suggested that there might be something wrong with these theories, indicating that the support for old theories has a kind of magical power. Admitting a mistake in a theoretical foundation that has become almost a religious dogma would mean risking the status quo. When one learns that the only way to maintain prestige is to ignore new evidence, what other alternative is there but to remain in one's cherished theoretical bastion? Science does indeed seek the truth – but if that truth looks too different from our favorite theories, then it is best simply to ignore it.

14.3. Distrust and Loss of Scientific Leadership

It's possible that some of the failures in science stem from a lack of trust in the very essence of scientific inquiry. The fact that Czechia has lost its leading position in many fields may be a result of this reluctance to believe in its own scientific capabilities. History shows that works like those of Dr. Janský and Gregor

Mendel, which gained worldwide recognition only thanks to foreign discoverers, are examples of this trend. Instead of focusing on real engineering methods and technical advancements, we get stuck in philosophical reflections and speculations. When science stops focusing on practical applications and falls into a passive role, it's not surprising that even those who were supposed to lead it forward turn away from it. Perhaps we should start concentrating more on what truly works, rather than being carried away by philosophical flights and theoretical "wisdoms" that leave us in place.

14.4. Possibilities of Validity of Reciprocal Physics

Reciprocal physics has not yet been scientifically confirmed. There are two possibilities:

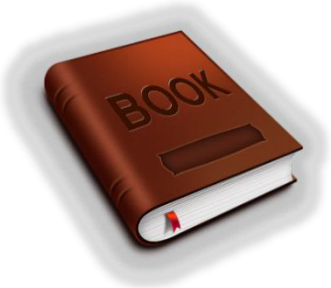
14.4.1. **If Einstein's theories and findings are invalid**, then the evidence presented in this discussion is also invalid. The entire nature and universe are governed by unknown forces, allowing us to construct any model of the system, all of which may hold similar scientific value. Any hypothesis proposed over the past few thousand years could be valid.

14.4.2. **If Einstein's theories and findings are correct**, then the evidence presented in this discussion also holds. This "belief" would allow the creation of a single model of the system based on technical principles, which some refer to as a **theory of everything**. If these principles are accurate, it could accelerate the development of science, the utilization of energy, and the construction of new materials. If physics can be based on the rejection of Einstein's theories, it is also possible to create a physical system based on their acceptance. There is no evidence to prevent this.

14.5. History of Technical Methods and Scientific Knowledge

Technical fields have deep roots in millennia of objective scientific discoveries. While it is impossible to know everything completely, a fundamental level of knowledge is essential for progress. Ancient civilizations, such as Egypt and Rome, achieved remarkable results in architecture and construction even without modern building materials. The key to their successes was their ability to effectively apply systematic procedures and work models based on the knowledge available at the time. Today, we face the challenge that our current scientific knowledge has not yet uncovered all the connections and phenomena in nature, and thus not all elements and their interactions. However, what we already know allows us to construct a fundamental model of the function of nature and the universe, such as Reciprocal Physics. This model remains valid only under the assumption that the natural laws defined by Einstein at the beginning of the 20th century are correct. As stated in the introduction, this assumption is crucial for the validity of Reciprocal Physics, even though scientific methods and technical approaches continually examine and update our understanding of nature.

„The End “



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Reciprocal Physics

Physical Model from the Perspective of Technical Methods

Discover a new physical model that explores the interconnectedness of all phenomena in our universe. Reciprocal physics offers an innovative approach based on the idea that if Einstein's equation $E = mc^2$, which shows the creation of energy from matter, holds true, then its reversed version $m = E * c^{-2}$, suggesting the creation of matter from energy, should also apply. Developed in the 1970s, this model is consistent with Einstein's theories and reevaluates the traditional view of gravity. Instead of the attraction of bodies as described in current physics, this model logically deduces that bodies are pushed toward each other. This approach finds support in discoveries such as gravitational waves, first detected in 2015, which confirm this model.

Reciprocal physics also offers new perspectives for clarifying unresolved issues, such as the mysterious acceleration of the Galileo spacecraft, anomalies in the motion of the Pioneer spacecraft, inconsistencies in the movement of Mercury's perihelion, and unexplained gravitational phenomena in the Kuiper Belt, including the unsuccessful search for a ninth planet. While the cumbersome current science still struggles with understanding these phenomena, reciprocal physics opens new avenues for discovery and perspectives in the field of physics, offering a fresh viewpoint on understanding nature.

"On Earth, we see the consequences of gravitational force, but its essence remains hidden from us. We know its effects, but we do not know what actually causes it." - Isaac Newton

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