

# How the Universe Works. Part II. Philosophical Content and Physical Nature of Electromagnetic Energy and Its Generation. Electric Current

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## Abstract

Electromagnetic energy is one of the most common types of energy mastered by mankind, which is widely used in all spheres of human existence. But to our great surprise, there is still no solid explanation of its physical nature, the nature of electric current, nor the physical nature of its generation, distribution, and use of electric current. A number of their key properties are also not known. There is no scientific interpretation of the physical nature of electromagnetic energy, and the nature of electric current. Although these are related natural phenomena, they are different in nature. Therefore, today it is strictly necessary to provide scientific coverage of these gaps, which will offer ample opportunities for the correct interpretation of their nature, as well as the improvement of technologies for both the production of electricity and the use of magnetic energy in general. Based on the proposed theory of a single energy body, the topic of philosophical rethinking of the physical nature of matter, especially its components—matter and energy, is extremely relevant in this context. The Universe is unified and self-sufficient. All laws in there apply in the same way without any exception. Energy, being the mover and driver of all processes in nature, as well as the means of action of Newtonian force, dictates all laws of the Universe and governs all processes in nature. There is no single process anywhere that has taken place without the effective influence of energy.

## Keywords

Matter, Substance, Energy, Energetic Body, Magnetic Energy, Energetic Current, Dynamic Head, Magnetic Pressure, Dynamic Force

## 1. Introduction

Matter is the universal unit of construction of the Universe and is made up of

substance and energy. These are two components of the whole and work in nature as an integrated complex. There is no substance in nature separate from energy since it is a substance that radiates energy on a constant basis. Radiation is not a really correct term. It is a condition, or even a mode of existence, of matter. That is the matter that is constantly shrouded in energy. Matter partly consists of energy, which provides all its connections, both at the micro and macro levels. The substance is a quantitative quantity that is part of matter in its elementary state. Substance is a quantitative quantity that is part of matter and exists in the state of elementary particles (EPs) of substance, which are interconnected by elementary particles (EPs) of energy, thus ensuring the unity of matter. Energy is another component of matter. Each EP of substance is endowed by nature with the force of attraction on the one hand, and the force of repulsion on the other, which is provided by the force interaction of the elementary parts (EP) of energy. This process is infinite and continuous in time and does not depend on the distance between the individual objects of matter. This is a basic property of it. The ability of the EP of substances to interact with each other through the force of energy is a fundamental property of the material world. Energy is a power characteristic of the interaction of material bodies, regardless of their size. The force is the main characteristic of energy. No force—no energy. The carriers of the force of interaction are EP of energy. It is known how strong intermolecular bonds can be in metals, for example. To destroy them, it is necessary to apply a force that will be greater in magnitude than the force of intermolecular interaction in the metal, for example:  $F_{1-2} > -F_{2-1}$ . And this force must be the force of energy too, but higher.

These phenomena were described by Isaac Newton (Isaac, 1992) and prove that all phenomena in the process of interaction occur by means of force  $F$ . Atoms in molecules of combustible materials are connected precisely by force bonds of energy. When heated during combustion, these bonds are destroyed, causing much of the thermal energy to be released into the atmosphere. As a binding force link in the process of interaction, energy can exist, and really exists outside of material bodies, acting as an interaction between them at a distance. In outer space, the distance between the sun and the planets is billions of kilometers. However, the sun's gravity holds all planets and material objects in its forceful embrace.

This process is ensured by the force action of the elementary particles of energy. Energy is a quantitative quantity and tends to accumulate, which is the most significant factor in explaining the physical nature of the problem of global warming. The entire Universe, as well as the solar system, is full of energy. Its volume in the Universe is constant and is satisfied for all processes that take place in it continuously. It cannot be created or liquidated. The energy volume that acts outside of material bodies and serves for the interaction between them is free energy.

The energy involved in intraatomic and interatomic bonds, as well as in intermolecular bonds in crystalline and other structures of material bodies, is bound, and it is not free. It is very difficult to break these bonds, which bind elementary particles of matter together, and require spending a considerable amount of en-

ergy.

That part of the energy that is not involved in the structural construction of material bodies, but acts outside of them, is, relatively speaking, free. In modern scientific practice, they are called charged particles, or free electrons in solids of conductors, for example. In the conditions of the earth, it is the action of the force of gravitational energy, the gravitation energy flux. It being extremely powerful, the flux of energy permeates all material formations, as well as a space between material bodies voids from the very center of the planet, all the way to outer space. In outer space, the gravitational force of the sun reigns, the energy of which fills the entire space of our solar system, including all planets and material bodies. It is known that the sun carries thermal energy to the Earth on a constant basis, enveloping it in an invisible layer of heat, and protecting it from cosmic cold. The rest of the free energy goes beyond the solar system, allowing it to interact with other space systems. The concept of free energy is relative. Like bound energy, it performs the function of energetic interconnection between material bodies, only on a higher level. Its composition and physical properties are the same throughout the Universe. Because it is energy that is the connecting chain of interaction between all material bodies. In the combustion of fossil fuels, for example, complex organic compounds bound by energy decompose with the release of previously bound energy, and its transition into the environment, where it becomes free. The same energy is released and becomes free during the decay (or fusion) reaction of the nucleus of atoms. This is the proof of the unity of energy at all levels.

The existence of free energy in the form of elementary particles of energy, or free electrons, or charged particles, is an extremely important factor in the sense that it is the free part of the magnetic energy of the mass of the earth (atmosphere) that is the basis for the generation of electromagnetic energy and the creation of electric current.

Force is the main energy component, regardless of whether its action is static or dynamic. Energy is a quantitative value. Behind the dam of a hydroelectric power plant of a certain height, the force of the static pressure created by it acts on the bottom of the reservoir at a certain point. The total amount of force will depend on the number of those points. The water energy flow of the static flow, falling from the height of the dam, turns into a moving dynamic flow. The magnitude of the force of the downward flow at the height of the bottom of the reservoir will remain the same, only it will act dynamically, that is, repeated many times over a certain time.

The formula of the strength of electric current vividly illustrates this process. (Blaise, 1653)

$$I = \frac{q}{t} \quad (1)$$

where  $q$  is the magnitude of the force (charged particle),  $t$  is the time interval.

This formula with a clarifying coefficient in the same way explains the strength of the dynamic flow EPE, expressed in terms of the velocity of the energy flow.

The same EP of thermal energy takes place in heat fluxes.

It is this force, repetitive in time, acting on the blades of a watermill or a squirrel wheel in an electric motor, that causes the latter to rotate. The force is the only power in nature that is able to do so. Force is the universal unit of the Universe, and its carriers are charged particles that are charged with force. The force in mechanics, in thermal or magnetic energy flow, regardless of statics, kinematics, or dynamics, has the same nature.

The water energy flow of a static flow is converted into a descending moving dynamic flow. The force remains the same, only it will act dynamically on the blade of the water mill. Force is the universal unit of the Universe, and its carriers are charged particles that are charged with force. Force in mechanics, in thermal or magnetic energy flow, regardless of statics, kinematics or dynamics, has the same nature. The difference lies in the physical nature of the processes and the number of charged particles in the processes involved. The concept of force was mathematically introduced by Newton Issac and Pascal Blaise (Blaise, 1653) as a generalized quantitative total value of the force of elementary particles of energy (ECE), which is an elementary unit of pressure force, or a charged particle in nowadays scientific practice. However, in some contexts, the concept of ECE—the carrier of a single force of interaction—is the most concretized.

The existence of EPE energy, which in physical terminology is defined as “charged particles”, has been established experimentally, and is recorded by instruments. The devices record the strength of the energy of the interaction of their carriers. The difference in the physical nature of the process depends on the physical conditions and the nature of the interaction itself. In centripetal magnetic interaction and centrifugal thermal interaction, the nature of the interaction is different. The reaction to the direction of interaction will also be different. We see different processes. However, the force of interaction between two bodies, according to Newton’s third law, is the same in its nature, although opposite in direction.  $F_1 = -F_2$ . Pascal proved that the centripetal magnetic action of the pressure force of energy acts in the direction of the center of mass of the earth. At the same time the action of the centrifugal force of the rocket engine, acting centrifugally, pushes the cosmic device beyond the limits of the earth’s magnetic attraction. Despite the nature of the processes of interaction being different, the nature of force as a compulsion to action is the same.

By the formula of the law of conservation of energy

$$h\rho g + \frac{\rho}{2}v^2 + p = \text{const.} \quad (2)$$

Daniel Bernoulli (1738) definitively established the universality of this concept.

Where:  $p$ —is the fluid pressure,  $v$ —is the fluid flow velocity,  $\rho$ —is the fluid density, and  $g$ —is the acceleration of gravity.

The principles of its operation are described in detail by Blaise Pascal, Isaac Newton, and others. The unit of force is a massless elementary particle, in other words, a corpuscle, which is the carrier of the interaction energy emitted in the

process of the interaction. In other words, one unit of force is placed in one EP of energy. In physical terms, it is the force that is the physical content of a unit of elementary particle of energy. This explains the corpuscular nature of energy. It is the force that is a unit that quantitatively forms the value of the volume of material objects. In outer space, in the complete absence of matter, EP of energy forms the spatial volume of outer space. All outer space is not a cavity but is filled with energy. The outer space is energy physically. With the help of energy, the movement of all celestial bodies, including the Earth, occurs. Energy does not exist without force. The difference between force and energy lies in their functions. Force is an element of action, while a unit of energy is a spatial unit of volume in which this unit of force acts continuously. Force cannot disappear. It passes from one material object in the process of interaction to another. The concept of a state of rest is incompatible with the physical nature of energy. This is nonsense. According to Newton's third law, in nature, in contrast to the state of rest, there is a state of equilibrium, which involves the interaction of individual objects of matter with the same magnitude of force and opposite in the direction of action on a constant basis, continuously.

$$F_{1-2} = -F_{2-1} \quad (3)$$

This process can last for billions of years, continuously, providing stability to the construction of material structures. If, for example, a stone lies on the surface of the earth for a long period, it means that the process of interaction has been continuous throughout the entire time according to the third Newton law. The stone had not lost its weight. It stayed heavy. Energy is a continuous process of transferring the force of interaction between individual objects of matter. The process of transmitting the force of interaction in a state of equilibrium does not imply the physical movement of objects of matter.

The main property of EP of energy with the same direction of action of the force vector is their ability to combine into an energy flow, which thus acquires a wave nature. As a result, a force pressure is created, which acts directionally on a certain object of matter. The existence of energy pressure by means of force was predicted and introduced into scientific practice by Blaise Pascal. This phenomenon is called Pascal's law and is described by the well-known formula:

$$P = F/S \quad (4)$$

where:  $P$ —is the pressure exerted by the force in the process of interaction,  $F$ —is the force of this pressure and  $S$ —the cross-sectional area on which the force exerts pressure.

Each EP of substance is endowed with an exceptional natural ability to absorb energy on the one hand and radiate (give up) energy on the other. The nature of this phenomenal phenomenon has not been sufficiently studied, but it is this phenomenon that is the fundamental factor in the existence of the material world. This must be accepted as an axiomatic truth based on scientific observations and conclusions. Consequently, the only carrier of the force of interaction between

elementary particles of substance is energy, the basis of the construction of which is elementary particles of energy, or EP of energy for short. One of the results of this interaction is the unification of the EP of substance by means of the force of energy pressure into atomic-molecular or crystalline structures, from which various material objects and even planetary star systems and galaxies are respectively constructed. The elementary particle of substances interacts with each other by means of the force of pressure of the interaction energy emitted by the energy poles. Under natural conditions, the number of EP of substance poles of the same name corresponds to the chemical valence of chemical elements, since all chemical elements are built from different combinations of EP of substance interconnected by energy bonds. It is the combined action of the EP of energy force that keeps the chemical structures physically unified. This is the physical nature of the construction of matter. In this way, the forces of attraction are created between the individual EP of substance. These forces, which act at ultra-short distances, are very powerful and are emitted by substance on a constant basis, which ensures the stable unity of atomic and molecular bonds, and ultimately—the unity of interaction of all material objects. It is known how difficult it is to physically destroy, and dissect a water molecule into hydrogen and oxygen atoms, or how stable crystalline structures can be. On the other hand, this indicates how unstable are separated oxygen atoms, which instantly find an object of interaction precisely due to the presence of the free force of gravity of an individual atom? However, it is known how easily (relatively) the crystal structure collapses under the influence of an appropriate amount of thermal energy, turning metals into a liquid. Obviously, all this is ensured by the forces of energy interaction.

One elementary particle of energy is quantitatively equal to the unit impulse of an elementary particle of force of one quantum in size. That is, a quantum is a force energy structure or an elementary particle of energy. *One of the poles of the EP of substance always emits energy, the direction of action of the force of which is centrifugal, the other, on the contrary, is centripetal.* The presence of poles (positive and negative) has been experimentally proven. All EP of substance, without exception, have magnetic centripetal and centrifugal poles as this is a basic property of matter. It is with the direct participation of the poles that chemical reactions occur—both pairing and substitution. These are ultra-short-distance connections that are extremely powerful. The strength of the connections is different and depends on several factors that are not well understood.

The property of the centrifugal direction of the force is the energy of the thermal spectrum of energy radiation. The carrier of one pulse of the centrifugal direction of the force vector is an elementary particle of a quantum of centrifugal energy, which for convenience should be called a thermal or thermal quantum. That is, one EP of thermal energy is equal in magnitude to one quantum of thermal energy—t-quantum.

$$1\text{EPTE} = 1\text{t-quantum}.$$

The opposite pole of the EP of substance emits energy in the centripetal direc-

tion of the force vector, which is characteristic of the magnetic energy spectrum.

$$1\text{EPME} = 1\text{m-quantum}.$$

Under the conditions of the earth, it is the pressure forces of the magnetic interaction that always act in the direction of the energy center of our planet, while thermal energy always acts in the direction away from the center. Energy is a unified, elastic substance that, being the bearer of force, creates a pressure that always acts in all directions. The only difference between centripetal and centrifugal energy is the direction of action of the interaction force vector. Both types of energy are carriers of the same force—the Newtonian force. Centripetal forces of magnetic interaction ensure the unity of the material world, and ensure its integrity and rigidity, preventing material bodies from flying apart in space. On the other hand, centrifugal energy forces hold certain distances between individual atoms and molecules or their constituents, protecting material objects from excessive compression, thus providing a certain elasticity and elasticity to material objects, which can be observed in practice. It is the centrifugal direction of the energy interaction forces between the energetic bodies of the sun and the earth which they constantly radiate, keeping the distance between them on a constant basis owing to repulsive forces. At the same time, the magnetic-centripetal forces of mutual attraction do not allow the bodies to fly apart. These forces are not antagonists—they are forces of harmonious interaction that act simultaneously to ensure stability and balance in such a turbulent Universe.

The more thermal energy a material object receives, the larger its volume becomes, and its elasticity increases up to fluidity. This process is clearly observed in the melting of metals for example. It is the quantitative content of thermal energy that provides the so-called state of aggregation of matter. This is because the EP of thermal energy, being a physical volumetric unit, penetrating the internal volume of atoms or molecules, leads to a physical increase in their volume. At the same time, the amount of EP of magnetic energy remains unchanged. Therefore, energy is a volumetric characteristic of matter. The volume of a material object and its temperature depend on the ratio of the amount of thermal energy to the amount of magnetic one. It follows that temperature is a volumetric characteristic of a material body. Changes in the volumetric characteristics of body components are subjectively perceived by living organisms as heat or cold.

Therefore, energy is a volumetric characteristic of the space of the Universe and its physical content. In physical terms, the space of the Universe is the infinite receptacle of energy in which substance resides. The state of aggregation of a material object depends solely on the ratio of the concentration of elementary particles of the force of thermal centrifugal energy to the concentration of elementary particles of the force of centripetal magnetic energy in the medium.

The topic of the physical nature of electromagnetic energy in particular, and energy itself in general, is extremely relevant, especially against the background of its extremely intensive production and use. This topic is especially important in the context of the utilization of thermal energy, which has already become painful



in terms of global warming. But not only.

Energy is unified and holistic and represents a single energy body. Being the carrier of the static force of Newton and Pascal, and the dynamic force according to Bernoulli, its effect is nevertheless extremely diverse. What we see is a reflection of energy. The black color of outer space is the color of energy that can be seen in the night sky. It is important to differentiate the velocity of energy transfer from the velocity of the flow of elementary particles of energy. The interpretation of the physical content of the velocity process as the process of movement of a dynamic force energy flow with a certain value created by the pressure force provides an opportunity to explain the phenomenon of electric current, its differences, and interdependence on the static force magnetic flux.

Everything that happens in the universe happens at an extremely high intellectual level. The carrier of the intellect is energy. This explains the creation of artificial intelligence, which is the factor that radically changes the place and role of “Homo Sapiens” in the development of the Subjective reality (Oryabko, 2024) of the Universe as a whole.

Nature is self-sufficient and contains enough energy. There is no need to create it. In this regard, it is imperative to learn how to take it correctly from nature and most importantly, how to utilize it. Because the misuse of energy can have very negative, if not destructive, consequences.

Studying the physical nature and properties of the unified energetic body. Researching and substantiation of the philosophical essence, physical nature of magnetic energy, electric current, and their generation based on the theory of an integrated energetic body.

A correct understanding and interpretation of the nature of energy as the main component of the energetic body, as well as the unified energetic body of the Universe as a whole, makes it possible to believe that matter itself more than 90% consists of energy. However, taking into account the fact, that it is energy that is the physical essence, the filler of the volume of space, and the colossal size of the volume of the Universe, the share of energy in the volume of matter should be even greater. A substance is the rest, which is the carrier of mass. Comprehensive research in this area of knowledge, using modern scientific tools and technologies is strictly required.

Another main purpose of this work is to investigate and substantiate the philosophical essence, and physical nature of magnetic energy, electric current, and their generation on the basis of the theory of a unified energetic body, and an isolated energetic body in particular. Provision of the foundations and theoretical substantiation of the theory of electromagnetic energy generation and the creation of electric current as a moving dynamic magnetic flux is also one of the tasks of the study.

The final stage of the study is the substantiation of the hypothesis of the energetic tube as the main means of transporting energy in general and electromagnetic in particular. It is based on the fact that the energy itself, is a conductor of



energy regardless of its physical nature. The rationale for this phenomenon is based on the fact, that matter itself is more than 90% consist of energy. A significant part of the internal energy of the material conductor is free, and not involved in the structural construction of material objects, including the mass of the earth. Differentiation and correct interpretation of the physical nature of free energy in the composition of matter from the energy associated with the structural construction of the components of matter is extremely important. The base of electromagnetic energy generation is the free energy being pumped from the mass of the earth by the generator under pressure into the conductors, creating a dynamic magnetic flux of electric current. It is thanks to this that the material of the conductor, the generator, as well as the mass of the earth, remain non-damaged, which is extremely important.

## 2. Purpose and Objectives

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The final stage of the study is the substantiation of the hypothesis of the energetic tube as the main means of transporting energy in general and electromagnetic in particular. It is based on the fact that the energy itself, is a conductor of energy regardless of its physical nature. The rationale for this phenomenon is based on the fact that matter itself is more than 90% consisting of energy. The energy equivalent of one kilogram of mass is 89.9 petajoules. During the explosion of the atomic bomb in Nagasaki, 1 g of mass was lost. Therefore, from one gram of the mass of plutonium, this explosion released an amount of energy with explosive power equivalent to 21 kt of TNT. which destroyed the whole city. It was

only that part of the energy that was free. Even more energy remained in the plutonium fragments, which emit a certain amount of energy until nowadays.

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### 3. Materials and Methods

Based on scientific achievements in the field of elementary particle theory study, magnetism, and the development of energy, the substantiation of the theoretical foundations of the physical nature of energy in the light of the unity of its laws. Development of the theory of an integrated and isolated energetic body, its physical nature, and philosophical essence. Substantiation of the nature of electromagnetic energy, the physical nature of the phenomenon of electric current, as well as the theoretical foundations of their generation. Development of the theory of the dynamic head of a magnetic moving flux and the strength of the dynamic head of an electric current, based on the theory of the unity of matter and the law of conservation of energy. The significance and role of the Newtonian force as the main mover of electric current and a universal physical unit of the Universe.

### 4. Results

#### 4.1. Energetic Body

In the action of energy interaction, energy connections in nature occur on a permanent basis as a connecting element between individual objects of matter at all levels, regardless of the size of the objects themselves.

**Hypothesis 1:** An explanation of the physical nature of the substance and energy which are two components of matter, and their philosophical essence is possible only if they are considered as an integrated indivisible unified energetic body. Such a system represents an integrated indivisible system of a complex of all interaction processes taking place within its boundaries.

Thus, *an energetic body is a system of separate objects of substance united by an integrated system of energy interaction within a unified energy space limited by certain boundaries. The external influence on such a body can be neglected.* An example of an integrated energetic body could be the Universe, a single galaxy, the star systems including our solar system, individual planets, and their satellites, and so on. The unified energetic body of the Universe does not imply any boundaries at all. Due to the uncertainty of many parameters of the Universe, this energetic

body can be considered econometrically only. Hereafter, it is reasonable to consider the energetic body of the earth or any other such systems with a smaller size as part of the unified energetic body or as a separate isolated energetic body.

Matter, which is essentially a unified stuff is made up of two components—substance, and energy. The manifestations of the properties of substance, and especially its functions, are fundamentally different from the properties and functions of energy. The substance is the visible part of matter and has a fixed volume that does not depend on temperature, pressure, and other natural factors. Energy, on the other hand, is an external factor of interaction and is the physical essence of space. It is the physical nature of energy, its properties, and means of interaction that are the main topic of this study.

There is no state of dormancy in nature. It is even theoretically impossible to allow. Matter exists in the constant interaction of its individual objects with each other. The basis of the material world, of course, is the substance, which is a carrier of mass, a quantitative physical quantity. Energy, in turn, is a superstructure, and its function is, so to speak, to serve the needs of substance. Energy does not have, and under no circumstances can it have mass, because it is a quantity derived from mass. That is, energy is a power with which material objects interact with each other, being an instrument of their interaction. The existence of energy in the form of an integrated energetic body in the form of an immovable ether, as a special immovable stuff, relative to which cosmic bodies move in interplanetary outer space, was predicted by Hendrik Lorentz. (Hendrick, 1895) The topic of the physical filling of outer space has always been and remains extremely relevant in our time. Energy is the philosophical essence and physical content, the physical filling of space as a really existing substance—ether. Cosmic bodies can neither exist nor move in a void in which there is nothing. They move in a boundless ocean of energy that fills all the space around them. However, energy is not completely immovable. It is energy moves the celestial bodies, by the moving flux of the own force of energy in the process of interaction. The celestial bodies cannot move on their own. It is energy, with its inherent power, that moves all cosmic bodies by powerful energetic currents.

The main function of energy is to ensure the unity and functionality of the material world. For example, the sun, due to the energy of gravity and repulsion (interaction), holds planets and other material bodies around it, thus ensuring the unity of the entire solar system. The planets accordingly act in the same way. That is, they all have at their disposal a kind of invisible hand that lead the planets and other cosmic bodies clearly along their orbits. But the main thing is these laws are stable and inviolable. Quantitatively, energy does not directly depend on the amount of mass of an individual material body, but on the state of the density of the force of the interaction of energy in the process of interaction of individual objects of matter. It is implied that an astronaut, for example, being a mass body, is in different conditions on the surface of the earth and in outer space. The magnitude of the energy of gravity on the surface of the earth and in near-Earth orbit

is completely different, and practically does not depend on the mass of the astronaut himself. That is, an astronaut is in different conditions within certain energy volumes with different energy densities. An astronaut is in a state of weightlessness in orbit not because there are low values of the force of gravity, but because the difference in the forces of interaction between the earth and the sun at a given point is zero. At the same time, these are the magnitudes of the forces that ensure the rotational motion of our planet around the sun, the rotational movement of the earth around its own axis, and even the rotation of its satellite—moon. This is certainly a very significant power. All this is provided by energy flows of colossal magnitude, which are generated both by the energetic body of the sun and by the energetic bodies of the earth, the moon, and all other planets of the solar system. Each such separated energetic body is a spatial body of a certain volume, bounded by certain boundaries, and is called a bounded or isolated energetic body.

In a physical sense, an energetic body is a unified material stuff, which is made up of substance and energy. In nature, substance, and energy act as a unified whole and together create the matter. The concentration of matter in the Universe as a whole is very heterogeneous and dispersed by separate islands both in the unified energetic body of the Universe as a whole and in a separate isolated energetic body of our solar system or any other star system in particular. In contrast to substance, energy fills the entire space of the Universe without exception, including partly separate objects of matter, and is its all-unifying stuff. It is an elastic stuff with spatial action of force, which consists of elementary particles of the Newtonian force of interaction. The energy in the Universe can theoretically be compared to the mass of water in a boundless ocean in which celestial bodies, planets, star systems, and galaxies are submerged. There is not the slightest void free of energy in the entire Universe because it is all-pervading. It is impossible to create a material barrier through which energy would not penetrate. This is because energy is most of the composition of matter. And the conductor of energy is energy itself. Energy exists in outer space, where the substance is absent at all, thus performing the control and execution of coordinated actions of all cosmic bodies, from cosmic dust to planets and their satellites in an integrated energetic body of the solar system. There is no vacuum in nature, that is free of energy. It is impossible to create an energy-free vacuum, even theoretically. Energy is a universal stuff that provides internal bonds of atoms, interatomic bonds in molecules, and intermolecular bonds. It keeps individual objects united, planets with their satellites, star systems, galaxies, and the entire Universe. Energy is capable of melting all minerals without exception, even the hardest and most refractory, making them liquid, and even bringing some of them to a gaseous state, and so on. The energy keeps all living things in a viable state as well.

#### **4.2. The Physical Nature of Electromagnetic Energy**

Electromagnetic energy is one of the most common types of energy mastered by mankind, which is widely used in all spheres of human existence. But until now,

there is no thorough explanation of its nature and several key properties. There is no comprehensive scientific interpretation of electromagnetic energy's physical nature or electric current's nature. Although these are related natural phenomena, they are completely different. The electromagnetic energy that is generated and used by humanity is part of the broad spectrum of magnetic energy. Energy is unified stuff existing in nature in the form of an elastic spatial condition and performs the function of transmitting the force of interaction in the form of pressure according to Pascal's law. Blaise Pascal defines the action of force clearly as the basis of energy interaction in nature. There was no such name as the word energy at that time, but the essence of the issue is the same.

$$E = P = \frac{F}{S} \quad (5)$$

The pressure being created by the action of the forces acts in all directions with the same power. This property is ensured by the centripetal direction of force action of magnetic energy, and the centrifugal direction of thermal one. It is in this way that the harmony of the complex interaction in nature is created. Therefore, being components of an integrated, indivisible complex of interaction in nature—the unified energetic body, they are guided by the same laws and fully comply with the main law—the law of energy conservation. Comparing the natural phenomenon of magnetic static flow with the phenomenon of hydraulic static flow, it is obvious that these are analogous and equivalent processes. If Pascal's law of hydraulic static pressure is rewritten using the traditional symbolism of the theory of magnetism, then it becomes obvious that the formula for the magnetic pressure  $B$  of the force  $\Phi$  of magnetic induction is equivalent to the formula for the hydraulic pressure of Pascal's force. Both of the above processes express the pressure of the force of a static energy flow, according to the same rules described by Pascal's law.

From the definition of equivalence, it is known that two expressions are logically equivalent if they have the same truth value for all possible combinations of truth values for all variables appearing in these two expressions. That is, the expression of the magnetic flux pressure  $B = \frac{\Phi}{S}$  is equivalent to the Pascal hydraulic flow pressure expression  $P = \frac{F}{S}$ . The logical equivalence of the above expressions is obvious, so they have the same truth, therefore they are equivalent.

So,

$$B = \frac{\Phi}{S} \leftrightarrow P = \frac{F}{S} \quad (6)$$

where:  $B$ —is the magnitude of the magnetic energy flux pressure (magnetic induction),  $\Phi$ —is the force of magnetic pressure of the magnetic flux acting on the plane  $S$ ,  $P$ —is Pascal's hydraulic pressure, and  $F$ —is hydraulic pressure force.

*The conclusion from this is unequivocal. All the above processes are of the same nature and fully comply with Pascal's law. The physical essence of these processes*

*characterizes the processes of action of energy flows, hydraulic—according to Pascal, and magnetic—according to the definition of magnetic flux.* Pascal clearly and unambiguously defined the law of the action of force through the creation of pressure in interaction processes. So, the force  $\Phi = BS$  creates the magnetic flux pressure in magnetism in the same way working according to the rules of Paskals Law. This is the same Newtonian force, the universal unit of the Universe, which is universal, and irreplaceable in all interaction processes.

In 1900, Peter Lebedew (Lebedew, 1901) experimentally established and measured the pressure of light on solids and gases. This became an important scientific result, as the experimental proof of a mechanical impulse caused by a light beam. Thanks to this, the existence of two forms of matter, substance, and light, was theoretically substantiated and confirmed in practice. These phenomena were predicted by J. Maxwell (1902), who predicted that light, having a wave-particle nature, is electromagnetic radiation and tried to measure the pressure of light too. The main drawback of this conclusion was that light, according to Maxwell and Bartoli, was perceived as electromagnetic waves. But electromagnetic waves are magnetic in their nature, with a centripetal direction of action. Meanwhile, one of the main components of the light wave spectrum is thermal ones—with a centrifugal direction of action. The waves of the thermal spectrum of solar radiation, being centrifugal concerning the sun as a source, exerted caused pressure of a certain force on the experimental plate in Lebedev's experiment. However, it was by this experiment that it was established that light is an energy whose components are a force that exerts pressure on material objects. Sunlight is a universal energy phenomenon that includes virtually all components of energy. That is why it is black. A hypothesis follows from this. *The entire outer space, including all material objects, is filled with energy, which is represented by light radiation, which is the carrier of the force component, and together creates a single energy body.*

The entire outer space, including all material objects, is being filled with energy, which is represented by light radiation, which is the carrier of the force component, and together creates a single energy body. Light force is the density of the light flux of EP (corpuscles)—carriers of the force of energy in space. This ocean of energy was being created by the luminary with the participation of all material objects that are part of the body, rotating with the star, causing the translational rotational motion of cosmic objects. There are no suspended stationary objects in outer space because the space is energy, the filler of which is the force component that causes the action. Space is a receptacle of energy, which is its physical nature as well as its philosophical essence. Spanning the entire energy spectrum, being black in color, it is energy that can serve as a structural filler for black matter.

Bernoulli's law of conservation of energy and Bernoulli's formula are one of the most practice-proven laws of science.

$$h\rho g + \frac{\rho}{2}v^2 + p = \text{const.} \quad (7)$$

where:  $p$ —is the fluid pressure,  $v$ —is the fluid flow velocity,  $\rho$ —is the fluid density; and  $g$ —is the acceleration of gravity.

This law is considered valid for liquids and gases. However, magnetic energy, and its variant electromagnetic energy, is energy too. Therefore, the law of conservation of energy must be true for this energy either. There can be no more than one law of conservation of energy in nature.

Using the terminology and symbolism generally accepted in the theory of electromagnetism, the law of conservation of magnetic energy has the form.

$$B + \frac{k}{2} I^2 = \text{const.} \quad (8)$$

where,  $I$ —is the current force, which in practice is the velocity of the dynamic flow of magnetic energy—electric current, and  $k$ —is the coefficient of resistance. Expression  $\frac{k}{2} I^2$ —characterizes the value of the pressure of the dynamic high-speed head of the moving part of the magnetic flux—electric current.

From above the total magnetic pressure is

$$B \approx B_{int} + \frac{k}{2} I^2 \quad (9)$$

The value  $B$  of the total magnetic pressure (induction) in the isolated magnet energetic body of the system is the sum of the constant internal pressure of the magnetic energy  $B_{int}$ , and its dynamic component—the dynamic pressure of the velocity head. Dynamic pressure arises as a result of the movement of the EP of magnetic energy flow. The internal pressure of magnetic energy  $B_{int}$  is the fixed part of the magnetic energy flow, which is part of the atom-molecular construction of the material of the conductor. This part of the energy is stationary, but it's one that provides the route for the movement of the dynamic pressure head—the electric current.

The conductor of energy, magnetic or thermal, according to the previous definition, is the energy itself, which makes up the absolute majority of the volume of every material object. There is an unproven scientific hypothesis that all matter consists of energy, which is unlikely since the existence of a substance as a carrier of mass is obvious. Energy is a volumetric characteristic of the matter. So, most of the volume of a material object is the energy. The highest content of magnetic energy is characteristic of rigid, high-density materials, such as metal alloys, rocks, and so on. Thermal energy acting in the opposite direction is an antagonist in the process of electrical conduction of materials, causing physical opposition to the movement of magnetic one.

What is the difference between a metal conductor and a liquid—water? Metals are the same liquids with extremely high viscosity. The fluidity of materials depends solely on the ratio of the amount of thermal centrifugal energy to the amount of centripetal magnetic energy. The higher the content of thermal energy in the structure of a material object, the greater its fluidity, up to the liquid state.



### 4.3. Generation of Electromagnetic Energy. The Phenomenon of Electric Current

According to the existing traditional scientific terminology, elementary particles of magnetic energy are called charged particles. This name is not entirely correct. EPs of magnetic energy cannot charge and are accordingly discharged. They exist in nature on a permanent basis, being constantly charged by the force of magnetic energy, and are the basis of all magnetic interaction in nature. To be charged is their natural state. Only material objects can be charged and discharged—batteries, for example, which are charged by energy quantitatively.

Despite their widespread use in the latest technologies and industry, the physical nature of magnetic energy and electric current are phenomena that have not been sufficiently studied, which leads to a distorted and biased interpretation of it.

The phenomenon of electric current underlies the generation of electromagnetic energy. One of the main methods of generation is the creation of an artificial flow of EP of magnetic energy using a mechanical electric current generator. Naturally, the electric current generator is an ordinary electromagnetic pump. In this sense, the principle of operation of an electromagnetic energy generator and a power distribution network is equivalent to the principle of operation of a centrifugal water pump and the operation of water supply systems. The only difference is that a centrifugal water pump pumps water by creating a flow of a mixture of EP of thermal centrifugal energy and EP of magnetic centripetal energy by the working turbine of the pump, which are an integral part and included in the construction of water molecules. Energy in the structure of molecules of water in total is more than 95% of the total volume of water itself. The percentage depends on the temperature of the water. Under the action of the water pump turbine, an energetical hydraulic flow is created, which consists of a mixture of EP of thermal and magnetic energy in the composition of water. From this, it follows, that the basis of a solid water trunk is energy. In the process of mechanical rotational movement of the turbine of the pump, a continuous energy dynamic flow of centrifugal energy is created, which, by its force, forces the water to move to the pump outlet. The need to provide this analogy lies primarily in a visualization like a template.

Below, in (Figure 2, Figure 3), for clarity, there are illustrated diagrams of the construction and principle of operation of the turbine of the centrifugal hydraulic pump and the rotor-turbine of the generator of electric current of electromagnetic energy. It is the energy itself that fulfills the work, inducing or even forcing the substance to move or act. The mechanical rotational movement of the turbine of the pump creates a moment of force directed to the outlet of the pump. Due to the directional movement of the water-energy mixture, a dynamic liquid jet is created in the outlet of the water pump—the dynamic head with the value of dynamic pressure according to the formula:

$$P_d \approx \frac{\rho}{2} v^2 \quad (10)$$

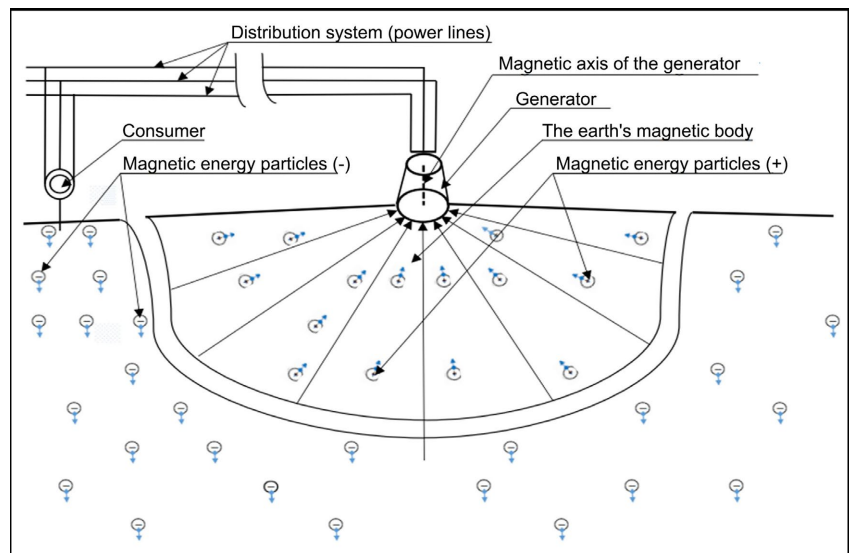
where:  $P_d$ —is the pressure of the dynamic head,  $v$ —is the flow velocity of the wa-

ter-energy mixture, and  $\rho$ —is the coefficient of resistance.

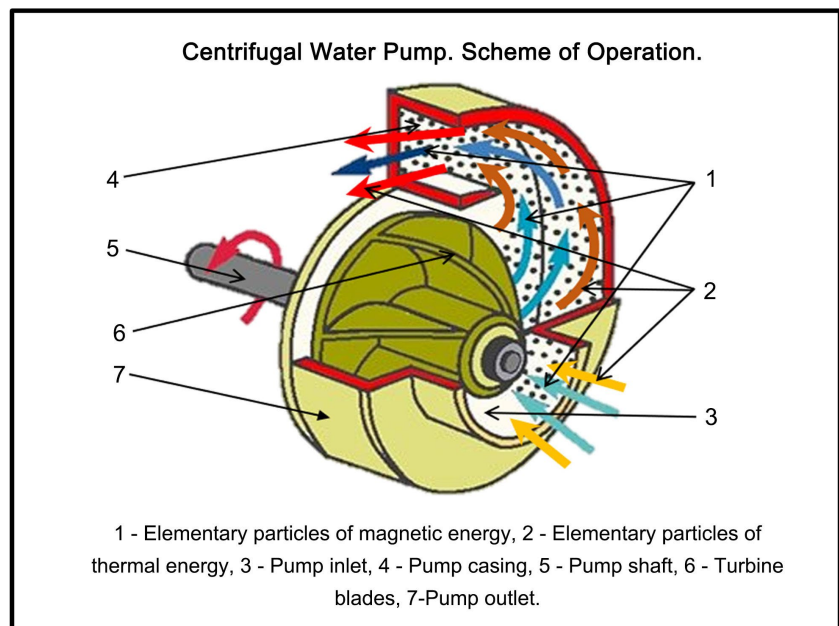
The essence of the above process lies in the dynamic movement of a certain number of e-quanta, carriers of the pressure force of energy in the plane of the pipe section.

Magnetic energy, along with thermal energy, is one of the main components of the energy balance of the Universe. The physical nature and principle of electromagnetic energy generation by a generator are equal to the principle of operation of a hydraulic centrifugal pump.

The schematic diagram of the creation of a magnetic energetic tube in the process of generating electromagnetic energy is shown in (Figure 1).



**Figure 1.** Illustrated diagram of the electromagnetic energy generation process.

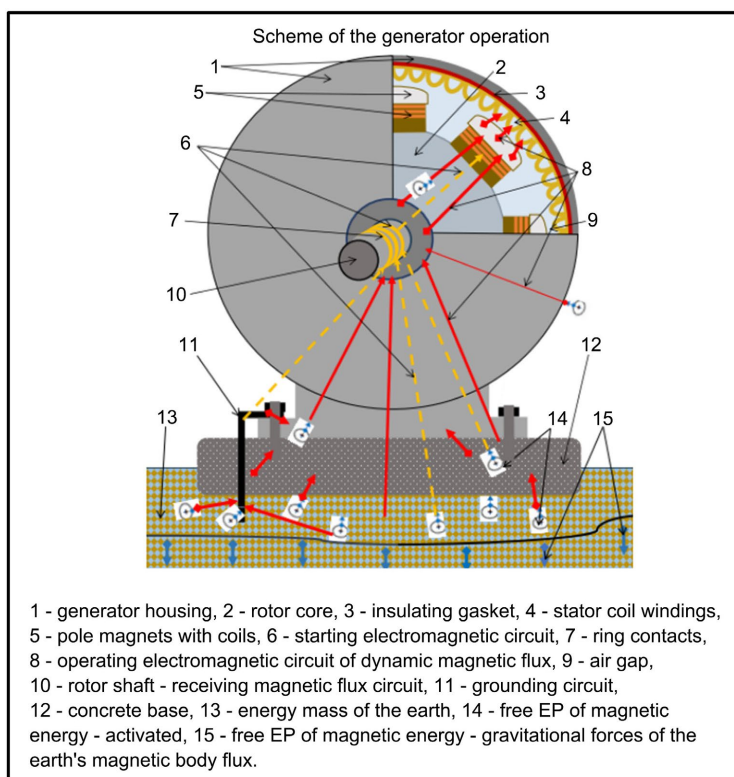


**Figure 2.** Illustration of water centrifugal pump EP of energy action.

The main physical content of electromagnetic energy generation is, first of all, the creation of a separate isolated energetic body of generation, and a separate isolated energetic body of the distribution and consumption system, which the generated by generator energy is transferred to. Both systems are separated from each other by an air gap between the poles of the rotor magnets and the stator coils in the generator.

The key link in the electromagnetic energy generation system is the generator, with the help of which the so-called difference in energy pressures (potentials) between the magnetic flow of electric current in the power supply system and the mass of the earth is created.

The function of the electric current generator is to physically pump exclusively m-quanta-elementary particles (EP) of magnetic energy into the windings of the stator of the generator. Elementary particles of magnetic energy play a dominant role in the process—the role of carriers of the force of magnetic energy created by the generator. Due to the transfer of magnetic energy pressure to the stator windings, a magnetic pressure or voltage is created in them which is many times higher than the same indicators in the earth mass near the surface.



**Figure 3.** Generator—electromagnetic pump. Illustration of the principle of operation.

A rotor of the generator (**Figure 3**) with pole magnetic coils, rotating around its axis, plays the same role as a turbine with blades in a water centrifugal pump. That is, it acts as an electromagnetic turbine. The role of blades in the generator is played by pole magnets with pole magnetic coils. For this reason, the body of

the rotor itself with pole magnets is a centrifugal magnetic turbine with magnetic blades. The essence of the process is the operation of the power pump to pump the EP of magnetic energy from the mass of the earth to the coils of the generator, and sequentially through the transformation system to the distribution and consumption system.

The law of energy conservation is universal and applies equally to all types of energy. So, according to Bernoulli's formula, the value of the pressure of the dynamic head of an electric current according to Formula (10), changing Pascal's symbolism to the generally accepted one in electromagnetism, will have the form.

$$B_d = \frac{k}{2} I^2 \quad (11)$$

where:  $B_d$ —is the pressure of the dynamic head force,  $I$ —is the current force, which is the velocity of the magnetic flux of the electric current,  $k$ —is the coefficient of resistance in the conductor.

By substituting the value of the magnetic pressure  $B_d = \Phi_d / S$  into Formula (7), and after the appropriate transformations, is obtained the formula for the force of the head of the electric current.

$$\Phi_d = \frac{k}{2} I^2 S \quad (12)$$

where:  $\Phi_d$  —is the force of the dynamic head of the electric current, and  $S$ —is the cross-sectional area of the magnetic flux.

In other words,  $F_d$  is the motive force or the force of the action of velocity pressure—the head of a moving dynamic magnetic flux. It is in the process of movement that this dynamic force, resting against the blades of the squirrel wheel of the electric motor (the blades of the water wheel), makes the mechanisms move. Without the direct action of force, no movement is possible. This is an axiom.

What is the amperage " $I$ ", which by another definition is the velocity of the magnetic flux of an electric current? The crux of the matter is that both definitions are correct. In the first case, we are talking about the number of charged particles that flow through a conductor. Charged particles, being elementary particles of magnetic energy, are functionally carriers of a force—namely, a moving dynamic force of magnetic flux of electrical current. In this context, the movement of the amount of EP of magnetic energy creates a dynamic magnetic flux—an electric current, the velocity of which is the amperage. This is the physical meaning of the concept of speed in essence. Generally accepted interpretation of velocity as the path  $S$  moving body over time  $t$  ( $V = S/t$ ) does not reflect the physical essence of the concept of velocity as a physical process. The fundamental physical content and philosophical essence of speed is in the action of its moving dynamic force. The greater the total number of EP of energy units of the pressure force carriers passing through the conductor, the greater the energy flow velocity will be.

$$I = \sqrt{\frac{2\Phi_d}{kS}} \quad (13)$$

Energy is a quantitative quantity. Therefore, here  $\Phi_d = \Phi_1 + \Phi_2 + \dots + \Phi_{n-1} + \Phi_n$ . Or,  $\Phi_d = \sum_{n=1}^n \Phi$ . That is,  $\Phi_d$  is the total value of the resultant force of all EP of electromagnetic energy (charged particles) that were involved in the process of movement of a dynamic magnetic flux. To create a directional flow of HF magnetic energy, electric current generators or concentrators are used, which are solar panels.

From this, it follows that the current strength is the dynamic pressure created by the total force of the energy flow of the electric current, which creates the dynamic pressure in the system.

$$I = B_d = \sqrt{\frac{2\Phi d}{kS}} \quad (14)$$

Therefore, the physical content of any velocity, regardless of its source of origin, is its dynamic pressure created by its motive force.

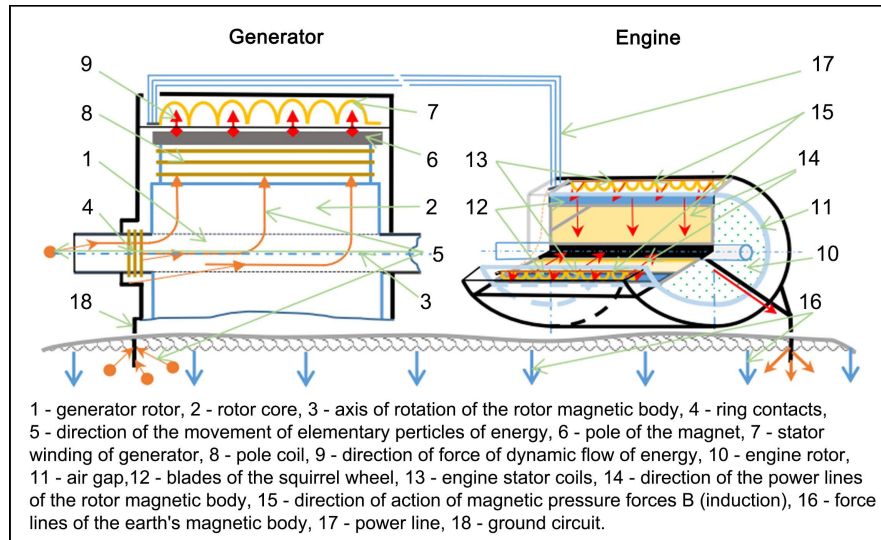
Before the beginning of the generation process, the direction of action of the force of all individual EP of magnetic energy had been directed to the center of gravity of the earth's mass (**Figure 1**). The magnitude of the magnetic induction pressure  $B$  in the generation process goes through several stages of transformation— $B_g \rightarrow B_0 \rightarrow B_1 \rightarrow B$ . At each of the stages, it has different values and performs different functions.

At the initial stage, the basic value of magnetic induction is its value in the mass of the earth  $B_g$ , or, as a special case, in the atmosphere. The starting pressure  $B_g$  of magnetic energy in the energetic body of the mass of the earth and the body of the generator rotor was the same. An artificially created magnetic body of pole magnets with a magnetic pressure value of  $B_1$  was connected to the magnetic body of the earth through a grounding system. The value of  $B_1 > B_g$  is a prerequisite for the creation of a single power trunk from the mass of the earth to the pole coils. This is necessary to change the direction of action of at least a part of the EP of the magnetic energy force in the surface mass of the earth to create a static flow of magnetic energy towards the pole magnets. In other words, it is creating the working an isolated energetic body from the mass of ground to pole magnets. With the mechanical rotational motion of the generator rotor, the magnetic body of the pole magnets begins to rotate together with the rotor (**Figure 4**).

The magnetic body means the magnetic energy created by the pole magnets and the internal energy of the rotor material, including the shaft, which is made of a material with a high magnetic energy content. This leads to the rotational motion of the entire magnetic flux and the occurrence of a centrifugal magnetic moment of the Lorentz force. The rotational motion of the magnetic body of the pole coils causes the flux of EP of magnetic energy—the initial electrical current—from the mass of the earth to the tops of the pole magnetic coils. Here, the artificially created magnetic body of the pole magnets acts as the blades of the magnetic pump.

An artificially created magnetic flux connected to a magnetic body of the mass of the earth creates an integrated continuous trunk of magnetic flux, a magnetic energy tube, from the mass of the earth to the poles of the magnetic coils. By the

gravitational force of the magnet poles, the direction of action of all the EP of energy changes in one direction, from the mass of the earth to the pole magnets, creating a dynamic flow head named the electric current. Another essential function of magnetic coils is that by interacting with a narrow spectrum of magnetic energy in the mass of the earth, they act as a filter, collecting the pure spectrum of EP of energy. Therefore, the flow of magnetic energy created by them is homogeneous, in contrast to the water-energy mixture, which makes the electric current extremely efficient in terms of use.



**Figure 4.** Illustrated diagram of the generator and engine work relation.

For a better explanation, returning to the beginning of the process, let's define that equally accelerated movement of the EP of energy from the axis of the rotor body to the stator coils leads to the creation of a low-pressure zone  $B_0$  along the magnetic axis of the rotor core, the value of which will be orders of magnitude lower than in the energetic body of the earth's mass, what means— $B_0 < B_g$ . In this way, the core area acts as the inlet nozzle of the electromagnetic centrifugal pump. A flux of electromagnetic energy (magnetic flux) from the mass of the earth is directed to the zone of low magnetic pressure. Due to the pressure drop along the rotor axis, the direction of the pressure vector of the EP part in the surface zone of the earth's mass changes towards the magnetic axis of the rotor. (**Figure 1**) Hereinafter under the action of the torque created by the rotational motion of the rotor with magnetic coils, the EP of magnetic energy receives additional acceleration. The speed of movement of the magnetic flux will increase in proportion to the increase in the angular speed of rotation of the rotor and acquire maximum values at the tops of the pole coils. In proportion to the increase in the speed of the EP, the moment of force of pressure created by the flow of magnetic energy at the tops of the pole coils will also increase. This force was described by the Dutch physicist Lorentz and is known in physics as the Lorentz force. The maximum value of the Lorentz force and, accordingly, the magnitude of the magnetic pres-



sure  $B_{\max}$  is created at the output of the magnetic poles. Under the influence of these forces, the magnetic flux of EP, having crossed the air gap between the rotor and the stator coils, is pumped under pressure into the stator coils. At this stage, a new magnetic body is created—an isolated magnetic body of transformation, distribution, and consumption. This body is isolated from the ground mass by an air gap between the rotor and stator in the generator on one side, and by a system of disconnect fittings installed at the end point in front of the consumption systems of the network. Under the influence of Lorentz forces in this system, a new flow of magnetic induction is created, with a pressure value  $B$ , which is the completion of the generation process. The rotor of the generator itself is directly connected through ring contacts to the mass of the ground, from which energy is taken. (Figure 1, Figure 4) The air insulation layer serves as a separating insulation barrier that separates the magnetic body of the generator rotor from the magnetic body of the stator coils and the distribution and consumption system. It also acts as a check valve, which is structurally designed to prevent the flow of energy in the opposite direction. At this stage, there is a change in the direction of the vector of action of the magnetic flux force to the opposite direction—from the stator coils of the generator to the mass of the ground, at the end point of consumption. When crossing the air barrier, the pressure force of magnetic energy suffers losses of a certain value, the coefficient  $k$  of which is determined experimentally, depending on the design of the generator. Therefore, the value of the operating pressure in the new system, taking into account the losses, will be.

$$B = k \frac{F \ell}{S} \quad (15)$$

where:  $F \ell$  —Lorentz force,  $S$ —the cross-sectional area of the newly created magnetic body. This is usually the cross-sectional area of a conductor in which a new magnetic flux of EP energy is created, the movement of which creates an electric current.

It is necessary to clearly distinguish between the phenomenon of electric current as the transportation of the carriers of the force of magnetic energy and the phenomenon of the transmission of the force of pressure  $B$  of energy. These are completely different, albeit physically related, phenomena.

#### 4.4. Energy Transportation. Energetic Tube

Energy generation, whether thermal or electromagnetic, is an extremely important link in the energy balance of the modern energy industry. But no less important is its transportation at distances, sometimes far removed from the means of their production.

There are various kinds of scientific, well-founded hypotheses that all material bodies, depending on their chemical composition and physical structure, are 90-98% quantitatively composed of energy. A striking proof of this can be carried out nuclear and thermonuclear explosions of the miserable volume of explosive material, as a result of which unregulated decomposition processes occur, or, con-



versely, the synthesis of atomic nuclei. With a negligible amount of explosive, a colossal amount of energy is released, the amount of which can only be calculated approximately. But the most important thing is that only neutrons can cause the destruction of atomic structures. Being neutral, neutrons are the mass carriers, i.e., the objects of matter. Neutrons are hardly the EP of substance, but the last ones are the main components in the construction of neutrons. It is they who are capable of destroying atoms and nuclei of chemical elements under the influence of energy power pressure. The rest of the ingredients of atoms or their nuclei are energy. Energy is not capable of destroying the atomic nuclear structure on its own, but being a carrier of force, it pushes neutrons to do so. The latter, under the influence of the pressure created by energy, breaks through the unstable protective energy shell of nuclei, leading to destabilization and destruction of the latter. This releases a huge amount of energy and free objects of substance—neutrons—which together due to the interaction of the force of energy create the nuclei of other elements. As a result of their synthesis, a considerable amount of energy, both thermal and magnetic, remains. Unlike energy, EP substances cannot exist in the free state separately but exist as a part of matter, integrated by energy. The energy itself cannot destroy a material object, but it can easily change its aggregate state, up to the state of plasma, which is probably a state of superfluidity. The main function of energy, which constitutes the vast majority of the volume of the structure of a material object, is to keep matter within the appropriate aggregate state. Even under conditions of ultra-high temperatures, characterized by an ultra-high content of thermal energy, matter does not collapse, because the destruction is counteracted by centripetal magnetic energy.

It is energy that fills the entire space between the individual EP of substance, which is only a small part of the composition of the matter object as a whole. From the above, it follows that when transporting material objects at a distance, the main part of the object of transportation is precisely energy. It is energy, not the substance that gives physical weight to material bodies, which is so heavy for carrying on or transportation because the substance is neutral in this sense. Behind the gravitational field of the earth is a zone of weightlessness because the gravitational forces of gravity there are negligible but considerable.

The more magnetic centripetal energy is contained in the structural structure of a material body, the heavier it becomes and the better it conducts energy. The very substance of a material object is a carrier of mass—a quantity of matter that really exists but is weightless. Substance, as a mass carrier, is a non-energy structure. It is not a conductor of energy also, but it is its primary source. Due to the presence of both negative and positive poles, each EP of substance emits the energy of interaction on a constant basis, that is, continuously, ensuring the unity of the material world. Radiation does not mean the fact of radiation itself; it is the fact of interaction. Interaction is a fundamental property of matter. Each EP of substance has a certain number of poles that are different in the direction of action. The action of them occurs on a constant basis. Due to the different poles with

different directions of interaction, the EP of substances can interact with each other, creating atoms and molecules of chemical elements through various combinations of pole interactions. The same principle of attraction is used to create crystal structures, as well as all material components of the material objects. It is the force of the interaction of energy that is the basis for the construction of the Universe. The greater the content of magnetic energy in the structure of a material body, the harder this structure is and the better it conducts energy. As the amount of thermal energy in a material body increases, its electrical conductivity decreases. The function of thermal energy, in turn, is to build compression pads between individual EP of substances, which makes material objects flexible and resilient. Consequently, the electrical conductivity of a material depends on the percentage of EP of magnetic energy in its construction, since it is magnetic energy that is the medium in which the movement of EP—carriers of magnetic energy force is possible at all.

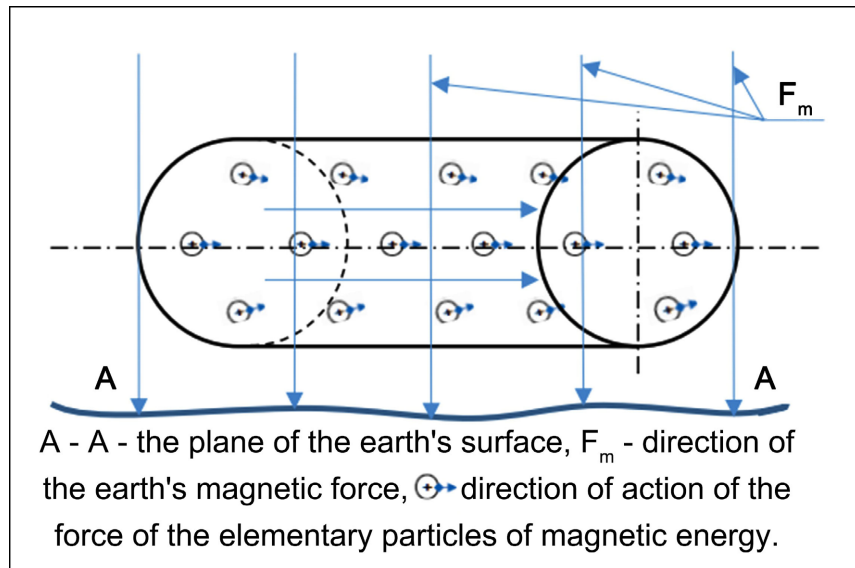
It is impossible to create a pure flow of electromagnetic energy—electric current in the conditions of the earth without constructing an isolated magnetic energetic body. The only exception may be a lightning discharge. Electric current is naturally a moving, dynamic magnetic medium. That is, not only individual EPs move but the entire magnetic medium, which in engineering practice is called an electric field, which is an electrical body in a real sense.

The entire space of the Universe, including the earth, is filled with energy since it is energy that is the philosophical essence and physical filling of space. Under normal environmental conditions, both the atmosphere and the body of the earth's surface contain a huge amount of energy. But despite this, the energy is dispersed in the surrounding environment more or less evenly. Therefore, it is its uniform dispersion that makes it impossible, or at least significantly restricts, the use of energy resources directly. This begs the question. Is it possible to transport the electrical energy generated by the generator or hot water in a free non-isolated space? Of course not. It's like transporting hot water in the open Arctic Ocean. The heat will just dissipate in it. Therefore, an artificially created isolated energy system is needed to transport energy. This is what Nicola Tesla could not guess.

An isolated energetic body is such a system, which is a part of the space bounded by an artificially created, sometimes natural protective barrier with an external or internal impenetrable (difficult to permeable) material shell. For energy, transportation is being used an isolated energetic tube, with an external or internal isolating barrier. The type of barrier depends on the kind of energy to be transported. For the accumulation, storage, and transportation of *thermal* energy flows, a thermal energetic pipe with an outer protective sheath is used. In practice, these are various kinds of pipelines and tanks. Pipe transport is the most common means of transporting thermal energy. By transporting hot liquids or gases in this way, we transport matter, the contents of which, however, are mostly thermal energy. In the case of hot water transported through pipes for heating, together with the substance of water, thermal energy is transported, which can make up 70% - 85%

of the total volume of the liquid itself. As for superheated steam, and even more so, because the physical filling of the volume of space of a material object is precisely energy.

Therefore, the pipeline that is used to transport thermal energy in the composition of liquids and gases is called a *thermal energetic tube with an external isolated barrier*. The outer sheath of a pipe made of metal or polymeric materials serves as an *insulating barrier to the energy* contained in the pipeline, thereby preventing the dispersal of energy in the surrounding space along with the liquid.



**Figure 5.** Magnet energetic tube operation diagram.

To transport electromagnetic energy, a design with an inner protective sheath is used, which is an all-metal pipe—a metal wire, which by its properties performs the function of a *magnet energetic tube*. The magnet energetic tube is the main and the only effective means of transporting electromagnetic energy through overhead power lines. (Figure 5) In such a design, the protective sheath that serves to prevent the scattering of electromagnetic energy into the environment is the air space of the atmosphere and the magnetic body of the conductor itself. This is ensured, first of all, by the low content of magnetic energy in the atmospheric mixture. Secondly, by the centripetal direction of action of the force of the EP of magnetic energy in the magnetic body of a conductor isolated by an air mixture from the mass of the earth. The magnetic gravity force of the earth's mass is extremely powerful. The power of centripetal forces in conductor metals is also extremely high, due to the high content of EP of magnetic energy in the construction of atoms and crystals in metals. The direction of the action vectors of the EP of internal magnetic energy is directed to the magnetic axis of the conductor, which prevents the dissipation of energy from overhead power lines into the atmosphere. This makes the structure extremely durable too. At the same time, the direction of movement of the dynamic pressure head  $B_d$  of the electrical current in the con-

ductor body acts along its central axis to the mass of the ground in the direction at the final point of consumption. Because it is the force of magnetic attraction of the earth's mass that is the main characteristic or component of electromagnetic energy transportation.

*A magnet energetic tube is a bounded, isolated magnet energetic body with a centripetal direction of action of the EP of a force of a moving flow of magnetic energy—electric current. The EP of the forces of energy acts directionally along the magnetic axis of the conductor from the source of generation through the consumption devices to the mass of gravity of the earth at the final point of consumption.* It should be emphasized here that the magnet energetic tube exists exclusively in the process of transporting electromagnetic energy by using electric current.

The substance of the conductor metal itself does not directly participate in the transmission process and performs the function of exclusively a container of magnetic energy. The conductor of energy, which is the essence of the magnetic energy tube, is the magnetic energy itself, which makes up most of the structure of the crystals or molecules of the material. The presence of a certain amount of thermal energy provides the metal with elasticity and resilience which is the positive. Resistance to conducting the magnetic energy caused by the opposite direction of action of the force of thermal energy is negative. After all, the electrical conductivity of materials depends on the percentage of magnetic energy in the structural organization of their molecular structures. The air mixture, which envelops the air electrical lines of conductors due to the low percentage of magnetic energy in its structure, is a poor conductor and serves as a reliable protective barrier for overhead lines. In cases of possible contact with the gravity of the earth's mass, properly protected conductors with additional insulating protection are being used. It is due to its properties—strength, flexibility, and low resistance by transporting energy in large quantities, the magnet energetic tube has become the most common means of transporting electromagnetic energy.

In the process of transporting electromagnetic energy, only the amount of energy that was taken from the mass of the earth by the generator is subject to transportation and especially consumption. Exceeding this figure leads to a forced extraction of magnetic energy from the internal bonds of the conductor material, which leads to an increase in the thermal energy content, overheating, and even destruction of the conductor material.

According to Bernoulli's formula, electromagnetic energy of magnitude  $B$  consists of internal energy, with a magnitude of pressure  $B_{int}$  and its moving part  $B_d$ , the dynamic pressure created by an electric current.

$$B \approx B_{int} + \frac{k}{2} I^2 \approx B_{int} + B_d \quad (16)$$

By substituting the pressure value into Formula (9), we get

$$\frac{\Phi}{S} \approx B_{int} + \frac{k}{2} I^2 \quad (17)$$

Hence the force of magnetic energy in the distribution system is

$$\Phi \approx \left( B_{int} + \frac{k}{2} I^2 \right) S \quad (18)$$

where  $B$ —is the value of the total pressure of magnetic energy in the system,  $B_{int}$ —the value of internal pressure in the conductor,  $\frac{k}{2} I^2 = B_d$ —the value of the dynamic pressure (head)—electric current,  $I$ —the value of the current force (velocity),  $k$ —the value of the resistance coefficient.

The dynamic part of the energy force  $B_d = \frac{k}{2} I^2$  is the working part of the total energy force. Passing through the rotor of the engine, it exerts a dynamic pressure  $B_d$  on the squirrel wheel of the rotor, forcing it to perform work-rotational motion. About 85% of the dynamic flow is spent on the performance of the work. This is established experimentally. The remaining 15% of dynamic flow is returned through the grounding systems to the earth's gravity mass, acting as a ballast. That is necessary for performing the working process with high quality. All described above useful work performed by an electric current is done by the power of gravity of the earth.

## 5. Conclusions

Based on the theory of a unified energetic body, the thesis of the unity of the material world and its component—energy—is substantiated. From this point of view, a clear explanation is given of the principle of the unity and indivisibility of the physical nature of energy, and the validity of the law of conservation of energy is once again confirmed. The Universe, the basis of which is matter, is self-sufficient. Matter, being a quantitative quantity, is made up of substance and energy. A substance is a carrier of mass only. The amount of matter in the Universe is constant.

Energy—the second part of matter is a massless component, the carrier of the force of interaction between individual material objects. According to the law of conservation of energy, energy is a quantitative substance that cannot be separately created or destroyed. The amount of energy is constant and quite sufficient for the functioning of all processes in the Universe.

The theory of the unity of the nature of the material world in the form of a unified energetic body provides a comprehensive and detailed substantiation of the physical nature of energy in general and electromagnetic one in particular. This theory gives an explanation of the nature of the dynamic pressure head of magnetic energy-electric current with mathematical modeling of the above processes. The force of the dynamic pressure head, the main mover of electric current, creates a dynamic velocity pressure, which is the dynamic head of electric current. This pressure head, passing through the working bodies of the electric motor, acting as a dynamic force on the squirrel wheel of the motor rotor, causes its rotational movement, according to the same principle as the force of dynamic water pressure head rotates the water wheel of the mill. The main essence of this process

is that this force acts in the same way in all natural processes of interaction and is a universal unifying unit of the Universe. The unity of the physical nature of energy is ensured precisely by force. The complete correspondence of Pascal's law to the theory of magnetic flux in magnetism is confirmed precisely because of the universal properties of the force, the driving force of the Universe. The only difference is that in hydraulics, the forces of centripetal and centrifugal energies act simultaneously. In electromagnetism, the force of magnetic centripetal energy acts in its pure form. This is because the physical essence of energy is precisely the directed action of force. Bernoulli's law of conservation of energy in hydraulics corresponds one hundred percent to the law of conservation of energy in electromagnetism precisely because energy united by the action of a force works according to uniform laws throughout the Universe.

The obtained results make it possible to clearly interpret the philosophical essence and physical nature of energy, as well as the phenomenon of dynamic magnetic flux—electric current. A detailed, deeper study of the gravitational component of magnetic energy will give a powerful impetus to the development of the electric power industry. It will make it possible to make greater use of the gravitational component of magnetic energy, which can provide an additional source of energy.

The topic of the physical filling of outer space has always been and remains extremely relevant in our time. The existence of an elaborated evidential theory of the existence of energy in the form of the unified energetic body, as a special slow-moving force substance, due to the action of the force of which cosmic bodies move, will provide an opportunity for a correct interpretation of nature of the cosmic open space. The definition of energy as a really existing substance with its own physical content as a physical filler of space instead of the abstract concept of ether will make it possible to correctly interpret the nature of real physical processes. Empty space does not exist in nature. It is absolutely obvious that cosmic bodies, along with terrestrial ones, can neither exist nor move in a void in which there is nothing. They exist and move in a boundless ocean of energy that really exists everywhere, filling the entire real volume of the Universe.

All material bodies, which are visible organs of vision, are composed of more than 90% energy. Energy in the conditions of the open cosmic space, or atmosphere of the earth, being in a rarefied state, is practically invisible. It becomes visible at higher concentrations in the composition of so-called liquids and solids. Hardness and rigidity are given to materials by the high concentration of centripetal magnetic energy in the structural and spatial construction of crystals, molecules, and atoms of material bodies. The resilience, elasticity, and fluidity of materials are ensured by the content of centrifugal thermal energy. Superhard alloys, when heated, become liquids precisely due to the high content of thermal energy in their structure. Centrifugal thermal energy, penetrating the structures of the material objects, increases centrifugal internal pressure inside, as a result of which their real volume increases, from which they become fluid.

Energy, with its inherent power and intellect, moves all cosmic bodies of the whole Universe without any error. It is energy, due to its inherent intellect, provides enormous opportunities in the development of information technology, up to artificial intelligence, which already exists in reality in the present time.

### Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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