

# The Physics of Gravity: A Hypothesis Based on Classical Physics

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**Abstract**—The alternative hypothesis of the physics of gravitation is put forward in this paper. The hypothesis is constructed on the laws of classical physics. The process of expansion of the Universe explains the physics of gravity. The expansion of the Universe induces the resistance of gyroscopic forces of electron's rotation. The second component of gravity forces is the resistance arising from the second derivative of linear expansion. This hypothesis does not reject the existing foundation of settlement, particularly as it is empirically constructed. The forces of gravitation and inertia share a common nature, which has been recognized before. The presented hypothesis does not criticize existing theories of gravitation; rather, it explores a separate theme. It is important to acknowledge that the expansion of the Universe exhibits isotropic characteristics. The proposed hypothesis provides a fundamental direction for further research. It is worth noting that this article does not aim to encompass all possible aspects of future investigations.

**Keywords**—Gyroscopic forces, the unity of the micro- and macrocosm, the expansion of the universe, the second derivative of expansion.

## I. INTRODUCTION

THIS article explains the physics of gravity as such and the inverse temperature dependence of the forces of gravity. Until now, the attempts by scientists to find an explanation for the phenomenon of gravity can be considered futile. Gravity (gravitation, universal gravitation) (from lat. Gravitas - "gravity") is a universal fundamental interaction of all material bodies [3]-[5], [7]. The existing theories of gravity are based on assumptions and conventions. The proposed hypothesis of gravity physics is based on the concepts of classical physics. The hypothesis is based on a planetary model of the structure of the atom. The proposed hypothesis confirms the general nature of gravity forces, inertia forces, centrifugal forces.

## II. MAIN PART

The proposed hypothesis is based on the concepts and terms of classical mechanics.

Gravity is the cumulative reaction of gyroscopic forces created by the rotation of electrons around their nuclei in the molecules of matter to the forces of influence that tend to unbalance them or have already unbalanced them. This reaction is aimed at returning the gyroscope to its original position. The force that unbalanced and continues to unbalance the atoms of matter is the force of the Big Bang of the Universe and the continued expansion of the Universe. We consider such a

manifestation of gravity as the formation of galaxies. The dynamics of the expansion of the universe occurs like an oar paddling on water. The movement of the paddle forms breakers (the whirlpool) on the water. The whirlpool is a model of the galaxy. In this process, the phenomenon of dualism is observed. At the same time, there is a process of expansion and compression. Compression occurs under the influence of gravitational forces. The inverse temperature dependence of the gravitational forces increases these forces. We consider the joint work of the inverse temperature dependence and the second law of thermodynamics. The second law of thermodynamics can be called the law of matter cooling. The simultaneous effect of the inverse temperature dependence and the second law of thermodynamics enhances gravity. As a result, a galaxy is formed. The negative temperature dependence of gravity is established experimentally [1]

The hypothesis explains the gravity force by the connection of the microworld with the macrocosm through the gyroscopic properties of an electron motion in its orbit. Such phenomenon as the expansion of the Universe should be understood as an external effect on the gyroscope (in this case, the role of the gyroscope is fulfilled by the rotating electron of the atom). The gyroscopic force (a combination of forces from the rotation of all electrons) of an electron tends to counteract the vector of the expansion force of the universe. The typical features of the Universe expansion are widely represented in the researches of scientists (Edwin Hubble, Ethan Siegel). The presented hypothesis does not contradict modern ideas of scientists about this phenomenon (expansion of the universe). The expansion of the universe occurs without a resultant vector that has a focus, i.e. directed from any one point. The expansion of the universe has a total character with the preservation of the internal processes of the system, which allows us to consider the system (galaxy, solar system, etc.) as an object.

The proposed hypothesis traces the close relationship between the micro and macrocosm. The rotation of the electron can be considered as a dynamic part of the gyroscope. Interatomic and intermolecular bonds can be considered as a static part of the gyroscope. Any external influence causes the reaction of this system (gyroscope). For the forces of gravity, the external impact is the Expansion of the Universe, for the forces of inertia, any external force driving an object and braking forces. There is also an inverse temperature dependence of the forces of gravity. Most likely, depending on the temperature, the stiffness of the static part of the gyroscope

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changes. Changing the stiffness changes the reaction (gravity) of the gyroscope.

In the article, *Commentary on the article "Biography of the Earth"* (EESJ No. 5 of 2018) [2], the origin of the planets of the solar system is explained by the ejection of the solar hyperprominence. It is quite possible taking into consideration the dependence of gravity on temperature. The higher the temperature is, the weaker the gravity. At the ejection stage, this dependence contributes to the ejection range (by billions of kilometers). The prevailing model of planet formation, which involves the formation of clumps followed by gravitational compression and the release of heat, is currently under scrutiny and subject to doubts. The presence of Saturn's rings provides a specific example that challenges this model. For some reason, this scheme cannot be applied here under any circumstances. The scheme itself does not contradict the laws of physics, but some critical mass is probably necessary for its implementation.

In the light of the above part, it can be assumed that the expansion-contraction of the Universe is a cyclical process. For example, the expansion occurs by the type of dough-like inflating, in all directions, without an obvious concentration of the center of expansion. On the scale of the Universe there is a process of expansion, on the scale of the galaxy there is a process of compression. This phenomenon of dualism is associated with gravity and has models in Earthly life.

There can be given an example to clearly illustrate the phenomenon of increased gravity at a decreasing temperature: the creation of negative pressure under the piston when it is advanced by an external force from the cylinder. In this case, the forces that prevent further extension of the piston (expansion of the Universe) increase, like gravity forces these forces tend to return the piston to its original position. In the article, *Commentary on the hypothesis "Biography of the Earth"* [2], the formation of the planets of the solar system and their rotation up to now has been presented as a one-time impulse receipt. Also, the connection of the macro- and micro-world has formed once and is still active today.

In the dynamic development of the Universe, it is recognized that two-way processes can occur. For instance, on shorter timescales, the Earth may experience a warming trend over a period of 20,000 years, while on longer timescales spanning billions of years, it undergoes a cooling process. Similarly, the Universe as a whole is expanding, while individual galaxies within it may experience compression. To obtain a more comprehensive understanding of the world, it is important to consider all these processes. It is possible that with such comprehensive approaches, the need to invoke concepts like dark matter and dark energy to explain natural phenomena may eventually diminish.

Our Galaxy can be seen as a leaf on a tree branch. A tree grows, a branch grows, but the leaf may dry out. The black hole in the center of the galaxy has its own gravity. Inside the galaxy, gravity is enhanced by decreasing distance and by cooling.

And, finally, we consider the phenomenon of mutual attraction of material objects. The same thing explains the nature of the gravity of an object to an object; everything that exists has one origin. The precession of the gyroscope seeks to

take its starting position. Everything that exists consists of gyroscopes that received an impulse at one point, at the point of the Big Bang. Currently, everything is available in a two-unit process that is an expansion from the Bang and the gyroscopic tendency to the starting point before the Bang.

Each hypothesis gives direction to further research in science [3]. The proposed hypothesis is not an exception. The gravity force (the one measured by a dynamometer) is determined by the resulting reaction vector of the totality of molecular (atomic) gyroscopes of an object (substance), of everything that exists. The proposed hypothesis explains the nature of the gravity force and does not pretend to revolutionize the calculation base of physical phenomena associated with gravity. It can also be assumed that the nature of inertial forces is similar to the nature of gravitational forces, but at a local level. The presence of gravity is an indirect evidence of the Universe expansion. In other words, the gravity is a reaction to some external impact. The external influence can be considered as the expansion of the Universe as such and various dynamic effects of the expansion process (acceleration, etc.). The proposed hypothesis more fully reveals the connection of the macro- and microworld. The existence of the negative dependence of gravity on temperature confirms the effect of the second law of thermodynamics, the irreversibility of the cooling of substance. Further cooling of the Universe leads to a process of increasing gravitational forces and subsequent compression of the Universe, to the cyclical processes of expansion and contraction. The compression process will lead to the new challenges and questions.

Another approach appears to be interesting [4], [5]. If we consider the force of gravity in connection with the dynamics of the process of the Universe expansion, we will conclude that the extension is associated with a change in linear size. The expansion rate is the first time derivative. This process can neither be directly nor indirectly determined. But, the second derivative is manifested in the gravity of the material object. Since the Universe expands simultaneously in all directions, the resulting vector of gravity is directed to the center of the Universe (from an object to a conglomerate of objects, from a small conglomerate to a large one and further to the center of the Universe). It turns out that the gyroscopic forces and forces from the second derivative of the expansion of the Universe are two parts of one equation.

It should also be noted that there is no absolute rest in nature. Any matter, molecule is in motion, including rotational. Any rotational movement causes a gyroscopic effect. The gyroscopic effect causes gravitational phenomena.

### III. INTRODUCTION FOR TEMPERATURE DEPENDENCE

The present article develops the direction described in articles [1] and [2]. These articles are conceptually connected. They point out the inverse temperature dependence of the gravity force, namely, the fact that an increase in the temperature of the object reduces the gravity force, and vice versa. The negation of gravitational forces as such does not exclude the use of the phenomenon "gravitational forces" in the text of the article, since in this case it refers to a natural

phenomenon in the generally accepted sense [1]. This article attempts to explain the apparent contradiction in the articles, namely, the inverse temperature dependence of gravity forces. The inverse temperature relationship seemed to contradict the claim that gravitational forces are the reaction forces of gyroscopic forces to the expansion of the Universe. With an increase in temperature, the dynamics of electron rotation increases, respectively, the gravitational force should increase, i.e. there must be some direct temperature dependence.

As a start, at the present stage, it is definitely necessary to establish the very fact of the temperature dependence of gravity forces. This fact is easily established empirically by measuring a body weight at different temperatures. It is possible to reliably establish the temperature dependence of gravity when the body temperature changes on the Earth. The influence of the Earth temperature on gravitational forces is a phenomenon of a completely different order and requires separate consideration and calculations, particularly due to the fact that it is related to the temperature of the Sun. According to the proposed hypothesis, all things in existence have the origin and are initially bound by gravitational forces.

#### IV. TEMPERATURE DEPENDENCE

The inverse temperature dependence of the forces of gravity has a huge impact on the formation of the universe. It seemed that an increase in a body temperature, accordingly, an increase in the dynamics of electron rotation, and accordingly, an increase in gyroscopic forces, should lead to an increase in gravity forces. However, in reality, the picture is completely different. The solution is most likely to be found in the structure of atoms and molecules. The rotation of an electron can be represented as a moving part of an atom, whereas the atom itself and the lattice of atoms can be represented as a fixed rigid part of the structure. Force gyroscopic effects are transmitted through this rigid part. The internal forces, the forces of intraatomic and interatomic bonds are much more significant than the gyroscopic forces of rotation of electrons. With an increase in body temperature, the forces of intraatomic and interatomic bonds decrease, and vice versa. Accordingly, when heated, the lattice of atomic and interatomic bonds becomes weaker, less rigid, and the reaction forces are distributed in the direction of deformation of the lattice, rather than on the transmission of the effect as a whole on the lattice as a structure (body).

The deformation of the lattice absorbs the external impact reaction with an increase in body temperature. Based on the proposed logic of dependencies, it is possible to construct a general graph of dependencies on temperature  $T$  connecting extreme points, see Fig. 1. As initial data while constructing the graph, the forces of the Universe expansion effect in a period of time are assumed to be constant. The gyroscopic rotational forces of «f» electrons are assumed to be in direct linear dependence on temperature. The proportion of gyroscopic forces reaction absorption from temperature is assumed to range from 0% to 100% according to some nonlinear function. The proposed graph clearly demonstrates the inverse temperature dependence mechanism of gravity forces. For

greater clarity, it is possible to present the dependence in time spans from left to right. Such a graph is provided in [2], namely, from the beginning of the universe to its end. Based on the presented graph of the inverse temperature gravity dependence [3]-[6], it can be assumed that a black hole is highly likely to represent the first phase of the gravitational collapse process, a connecting link forming a cycle, a closed process of the Universe at different levels.

Generally accepted ideas about gravity consider the mass of a body to be a source of gravity force, respectively, a gravitational field is created around this source. Such understanding of the nature of gravity is supported by the basis of estimate of this phenomenon. The basis of estimate was initially built empirically. In other words, first the basis of estimate was built, and then the allegedly theoretical basis - the concept of the gravitational field was adjusted to this basis. The proposed hypothesis is designed to destroy such a theoretical basis, with simultaneous preserving of the basis of estimate. The modern basis of estimate is obviously valid for the given historical period with relative stability over time.

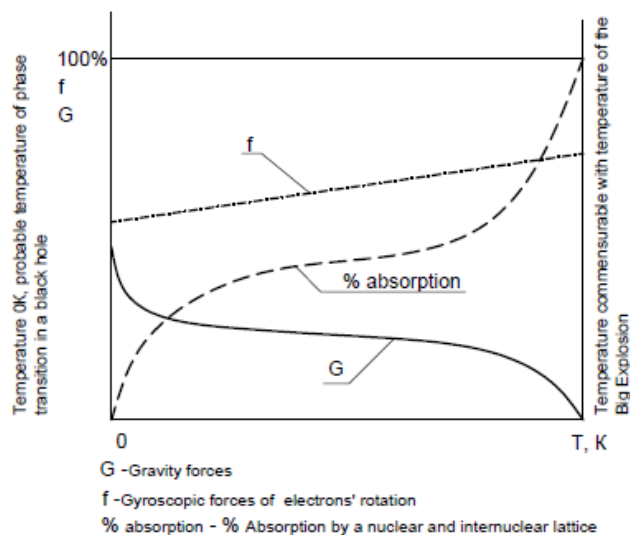


Fig. 1 The Schedule of dependence of forces of gravitation from temperature

#### V. THE DYNAMIC COMPONENT OF GRAVITY FORCES

It is evident that gravity forces consist of two components: dynamic and thermal. In other words, gravitational forces depend on the dynamics of the environment expansion-compression and the environment temperature (the thermal effect). The main component of gravity forces is dynamic (the thermal component is described above). In its turn, the dynamic component consists of two more elements: linear and radial. In any case, it is the second derivative of the expansion-compression dynamics that is relevant. When moving (expanding or compressing) in a spiral, in any case, there is a second derivative. This article is not intended to analyze the dynamic component of gravity forces; instead, it aims at describing the structure of gravity forces formation in general.

## VI. CONCLUSIONS

The main conclusion of the article is that the gyroscopic forces of electron rotation [8], [9] are the basis for the formation of gravitational forces.

The forces of gravity are the combined response of the gyroscopic electron rotation forces caused by the expansion of the Universe. It should also be noted that the expansion of the Universe is isotropic.

Gravity forces are based on the dynamics of electron rotation combined gyroscopic forces caused by electron rotation. As temperature changes, the changes in gravitational forces are influenced by the forces of the inter-atomic, intra-molecular and inter-molecular bonds which make up a certain rigid lattice. A change in the body temperature affects the rigidity of this lattice, and accordingly, it affects the force of reaction and gravity.

The scientific world has not yet come to a consensus on the temperature dependence of gravitational forces. The indirect evidence of this dependence is the process of vapor condensation, such as cloud formation, the structure of galaxies, and the gigantism of animal and plant life on Earth in the past period.

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