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Exploring the Energodynamic Theory of Gravitation: Unveiling the Fundamental Forces of the Universe

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ABSTRACT

The article supports the new theory of gravity and levitation, which is based on the fact that there are opposing forces of attraction and repulsion in the universe, depending on the direction of the gradient in the density of the surrounding space. This idea states that gravitational energy consists of both kinetic and potential (gravistatic and gravidynamic) components. Gravity is produced by forces that are proportionate to the density gradients and oscillation velocities of the medium. These pressures can occasionally balance one another out, resulting in levitation and weightlessness. The Newtonian law of gravity, the existence of "strong" gravity and gravitational equilibrium, the potential of harnessing gravitational energy, the production of all types of celestial bodies as a result of this energy are all effects of the new theory of gravity.

Keywords: Nature of Gravity, Newton's Law, Busting and Pushing Away, Gravitational Balance and Stability, Strong Gravity, Free Energy of Gravity

Introduction

Since the dawn of time, people have been curious about the origins of the natural world and the nature of gravity. Democritus's vortex model is regarded as the first existing theory of gravity.[1] He believed that gravity was a "emergent" property that resulted from the emergence of vortices in a substance that would later be named ether. Aristotle shared this belief and used the occurrence of whirlwinds in this medium to explain a variety of observed events.

After I. Newton deduced his renowned law of universal wideness from Kepler's laws of the motion of the planets, the question of the origin of gravity became more acute.[2] The rationale is that, according to this law, force has the same everlasting properties as mass and inertia as the "gravity" of bodies, which acts as an innate attribute of all bodies. As a result, notwithstanding Newton, many 18th-century philosophers continued to endorse the vortex theory of gravity, including Descartes, Huygens, Kelvin.

In the meantime, in 1690, the Geneva mathematician N. Fatio proposed a straightforward "kinetic" theory of gravity that provided an alternative explanation for the Newton's power formula. He proposed that the tiniest particles in the cosmos move in all directions at extremely high speeds randomly and directly, he demonstrated that the flux density of these particles falls off proportionally to the square of the distance. His theories, which gained wide spread recognition through correspondence with experts of the day, were not in vain, in 1756 Le Sage published the gravity theory he had developed, known as the "pushing" concept. His hypothesis provided a mechanical explanation for a variety of events, it gained more attention in 1873 in the context of V. Thomson's newly established kinetic theory of gases.

Le Sage's idea did, however, have a lot of flaws, according to its detractors. It was highlighted that moving bodies would have to experience noticeable inhibition by flying corpuscles, which was not observed, in addition to the logical issues. Later, calculations by D. Maxwell (1865) and A. Poincaré (1908) demonstrated that in the Le Sage model, the energy of these particles will undoubtedly transform into heat and melt everyone as well as ignite all the planets. Not in accordance with astronomical observations, nor with the absence of modifications to the Earth's and the Moon's trajectories brought on by their screening effects during lunar and solar eclipses. As a result, the Le Sage model was deemed unworkable at the start of the nineteenth century.[4]

Even while concepts of this nature were frequently articulated in the XIX century (M. Faraday, J. Maxwell, X. Lorenz, O. Heviside, etc.), numerous attempts to explain gravity as a manifestation of the action of electromagnetic forces failed to withstand the test of time. The similarities between Newton's and Coulomb's laws inspired the concept's proponents. However, electric forces only exist between charged bodies; gravitational forces exist between all bodies. Second, gravitational forces reveal themselves primarily in the presence of objects with astronomical scales because they are considerably smaller than electric ones. Third, only the forces of attraction in gravity are understood, whereas repelling forces exist in electricity. Fourth, magnetic interactions between bodies are dependent on the speeds of the bodies and are not present in gravity. Finally, gravitational screens do not exist, but the electric field is protected by conductors. One "electromagnetic" theory of gravity could not account for these discrepancies.

Numerous even less "physical" theories of gravity were developed as a result of general relativity's formalism. These include string, multidimensional, quantum, nonmetric, vector, scalar-tensor, other theories.[6] The gravitational interaction in them is typically ascribed to its own field and its own particle, which is the carrier of this field. However, no carriers of gravity have yet been found if other fundamental interactions' material carriers (mesons, bosons, photons) are discovered and analysed experimentally. In this context, it is interesting to build an alternative, energodynamic theory of gravity based on the most recent astronomical findings, which established the existence of the antipode of common "luminous" (baryonic) matter in the universe.[7] All prior theories acknowledged the presence of such an environment in some way, referring to it variously as "ether," "hidden mass," "physical vacuum," "field," "dark matter," and "dark energy," etc. Different models gave this world a variety of illogical imaginary characteristics. The proposed energodynamic theory, in contrast, is based solely on the fact that this substance is widespread, as acknowledged by all theories (including celestial bodies formed from it), on the experimental finding that it participates in gravitational interaction. All other characteristics of this stuff, which we shall refer to as "unstructured" (non-barion) for conciseness, are justifiable within the parameters of the suggested notion. Its objective is to demonstrate from the perspective of energy dynamics[8] that gravity is not at all a characteristic of material bodies, but instead results from the universe's heterogeneity, to derive from this a number of non-trivial conclusions of broad physical significance.

Methodological Features of Energodynamics Applied to the Universe

In contrast to quantum mechanics and general relativity, energodynamics develops the Newtonian idea of force rather than replacing it as a unifying explanation of the processes of transmission and transformation of any kind of energy. Similar to classical thermodynamics 7, its study methodology is based on the characteristics of the total energy differential as the most universal function of the system state. Energy dynamics functions similarly to it, taking into account all of the system's parameters rather than fragmenting the continuum into an unlimited number of conditionally equilibrium components as the theory of irreversible processes (TIP) does.[8]

This enables it to maintain the deductive (systematic) research strategy that is distinctive of classical thermodynamics (from the general to the specific and from the whole to the portion). When the system is split into an unlimited number of conditionally equilibrium pieces, it loses "system-forming" features, making it particularly pertinent1). This is accomplished by adding the spatial heterogeneity of the systems under study as a whole's missing parameters. The Universe must be viewed as a system that contains "everything that exists," or the full collection of interdependent material items, in order to take such an approach. By definition, such a system is isolated, closed (not exposed to external pressures F), closed (does not interchange matter with the environment). However, the universe's operations have continued for at least 14 billion years. This indicates that it progresses without reaching equilibrium. The fundamental tenet of classical thermodynamics, which holds that an isolated system eventually reaches an equilibrium state in which all macroprocesses are finished for good, does not hold true in this situation. The postulates of a local equilibrium consumer good, according to which the volume elements of a nonequilibrium continuum are defined by the same set of variables as in equilibrium, cannot serve as the foundation for energy dynamics.[8] This is because these "elements" of the volume are where the processes of interest are found.

Furthermore, the universe cannot be viewed as an isolated system for the purposes of the ideas of heat transfer and external work, external kinetic Ek, external potential energy Ep, its internal energy U from the "dispersed" (out of working) portion of the total energy7 itself becomes complete energy.[9]

The first principle of thermodynamics, which expresses the law of its conservation through the heat Q and the work W, becomes invalid in this situation because all of its forms are now parts of the internal energy. The reversible component of genuine processes cannot be disregarded in energodynamics, in contrast to TIP. All of this called for the development of energy dynamics on its own conceptual foundation, utterly rejecting the notion that genuine (nonstatic) processes preserve local equilibrium.

Energy dynamics' primary methodological characteristic is its rejection of foundational theories' postulates and hypotheses, as well as idealisation of processes. Energodynamics does not, therefore, adhere a priori to any model of the universe or the matter that makes up its substance when characterising an object of study. Instead, it divides the latter, if necessary, solely into a structured (baryon) and an unstructured (non-barion) component. Ordinary (observable) matter is referred to in the first instance, while the second refers to the majority of it, which is limited to gravitational interaction and thus invisible.[10]

The axiom of distinguishability of processes, which asserts the possibility of differentiating independent objects in the object of study by those special, phenomenologically distinct, irreducible to other state changes that they cause, plays a significant role in building energodynamics on such principles. The theorem that the number of reasons for the energy U of a nonequilibrium system is equal to the number of independent processes taking place in it may be proven "by contradiction" thanks to this axiom. The class of nonequilibrium redistribution of extensive parameters (mass M, numbers of moles of k-th substances or phases, entropy S, charge e, momentum P, its moment L, etc.) over system V holds a distinctive place among them.

Such processes stand out due to the opposite direction that they exhibit in different areas, phases, system components, which keeps them out of equilibrium even during quasistatic (infinitely slow) movement. Selecting a subsystem with volumes V' and V" within a non-uniform object of study in which the density of any extended parameter of the system i is larger or less than their average value can demonstrate the inevitable nature of such processes.

1 i V idV i / V = = = = Consequently, we have: (i ' - i)dV' + (i "- i)dV" = 0 1) due to the evident equality i = idV = i 'dV' + i "V" = idV.

As a result, there are always subsystems (regions, phases, components) in a non-uniform system where the deviation between i and i has the opposite sign. The dialectical principle of "unity and struggle of opposites" is expressed in this clause, which is known as the "principle of opposing processes" in chapter nine. The systems approach is not just desirable but required because it precludes the feasibility of investigating such processes by algebraically accumulating changes in individual system components.

Finding the coordinates, or parameters, of the redistribution processes in inhomogeneous environments is necessary since their flow depends on the change in those parameters.

We look at the general situation of redistribution of the density () i r, t = i / V by any significant parameter i in order to locate them (Figure 1). This distribution is depicted as a function of the radius vector of a point in the field r, it corresponds to the density curves () i r, t, potential i.

According to the diagram, some of the quantity i* of the carrier of the i-th kind of energy is moved from one area of the system to another in the direction of the dotted arrow if its distribution as a quantitative measure deviates from being uniform with a density. As a result of this "redistribution" of the extensive value i, its centre moves from its initial position of 1 iî i i dV R = r to its current position of 1 i i idV R = r, a "distribution moment" occurs Zi:

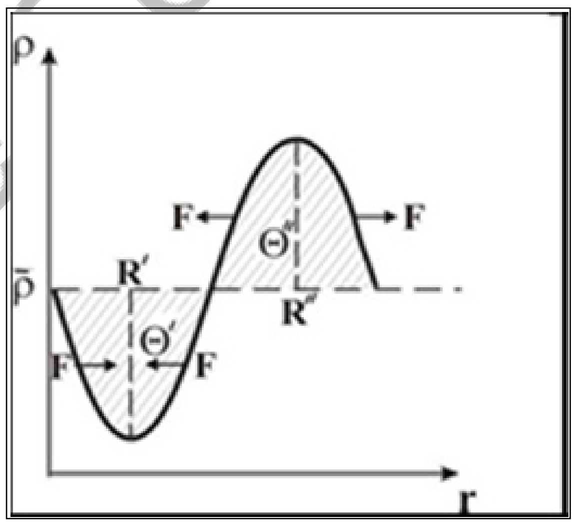

Figure 1.Wave Formation in Non-Barion Matter

$$\mathbf{Z}_i = \Theta\Delta\mathbf{R}_i = \int_V \left[\tilde{n}_i(\mathbf{r},t) - \bar{n}_i(t)\right]\mathbf{r}dV. \quad (2)$$

Thus, the process of redistribution of any energy carrier i Θis characterized by its center displacement vector – . Δ= R R R ii i î This means that the state of a nonequilibrium system is characterized by twice the number of state variables: ii i (U U,) = ΣΘΔR.1 In this case, its total differential can be represented as an identity (9)

$$dU \equiv \Sigma_i \Psi_i d\Theta_i - \Sigma_i \mathbf{F}_i \cdot d\mathbf{R}_i, \quad (3)$$

where i i U () / Ψ≡ ∂∂Θis the averaged value of the generalized potential (absolute temperature T and pressure p, chemical k , μelectric , φgravitational g , ψand other potentials); ( ) i i – U / ≡ ∂∂FR- forces in their general physical understanding as a gradient of the i-th form of energy, taken with the opposite sign. All such forces for isolated systems are internal, so their specific values i i / ΘFshould be called strengths and denoted by Xi. Under the conditions i Θ= const, this corresponds to the expression

$$\mathbf{X}_i = \Theta_i^{-1}\left(\partial U / \partial \mathbf{R}_i\right) = -\left(\partial U / \partial \mathbf{Z}_i\right).$$

A further application of energy dynamics is the use of identity (3) along with the uniqueness conditions (the conservation laws for parameters i , Θthe equations of state i i i i () ,Ψ= ΨΘRand transfer i i i i (,,)= ΘZZR·· initial and boundary conditions). In the conditions of uniqueness, any hypotheses, postulates, models are allowed, since they are subject to experimental verification. The uniqueness of such a method consists not only in the fact that all fundamental disciplines (including nonequilibrium thermodynamics) are its particular cases11 but also in the fact that the consequences obtained prior to the application of the uniqueness conditions have the property of immutable truths. Consider some of them.

Gravity as an Emergent Property

Everything objectively existing in this world is called matter. The centuries-old experience of studying its properties indicates that matter is in motion all the time. As long as it has a single property — the density ρ as a function of spatial coordinates (radius vector r), this movement is manifested in the fluctuation ρ(r) about its mean value (t). When matter is distributed evenly, this oscillation is characterized by the same deviation of ρ(r) from (t) in both directions, i.e. It has nature of the harmonic wave (Figure 1).

In such a wave, a reciprocal - forward displacement of the energy carrier ʻ Θ(in this case, the mass M) in both directions from the equilibrium state to a distance of / 2. | | ν Δ= λ R It is carried out for the period of oscillation, the opposite of its frequency ν. In this case, the average speed of the oscillatory movement of the mass of the wave M in this process ν , υ= λνwhich then determines the speed of its propagation in space, called the speed of light, c. In contrast to the speed of a traveling wave, the oscillatory velocity ν υchanges from zero in the antinodes of the wave to a maximum at its nodes, in the general case is a function of the density of the medium

$$\upsilon_v = \upsilon_v(\rho).$$

The density of the vibrational energy k , ρis in this case, the value k 2 ñ/ 2 ρ= ρ. Since in the zone of the antinode of the wave the kinetic energy k ρis completely converted into potential p , ρtheir sum remains unchanged and equal to 2ñ. ρ

If we take the offset module ν ΔRfor the amplitude of the longitudinal wave A, ν we come to the well-known expression for the wave energy density:[11]

$$\rho^k = \rho\ddot{A}æ\tilde{\imath}v^2 / 2, (\quad {}^{-3}), \tag{4}$$

Thus, the total energy of the primary matter U = Mc2 includes in the general case the kinetic component Uk, which it is expedient to call the gravidynamic component, the potential component Up, which we will call the gravistatic one by analogy. Before A. Einstein, the expression U = Mc2 was referred to the ether as the "primary" form of matter, from which all other forms of matter were formed (N. Umov, 1873; J. Thomson, 1881; O. Haviside, 1990; A. Poincare, 1900; F. Hasenorl, 1904 [1]). A. Einstein (1905) extended this expression to all forms of energy and matter and, putting c=const, began to treat the proportionality of mass and energy as the principle of their equivalence.

We now apply identity (3) to any region of the Universe with a constant volume V, whose mass M dV = ∫ρincreases in the process of matter flowing into it from the outside. Expressing the energy of the region uU V = ρthrough u ρand using the expression known from wave theory for the propagation speed of oscillations in an elastic medium as a function of its density 2 u () / , ()ν υρ= ∂ρ∂ρ11 from identity (3) as ñ ν υ= we find the local gravitational potential of this region:

$$\Psi_g \equiv (\partial \grave{U} / \partial \quad)_V = (\partial \rho_u / \partial \rho) = \tilde{n}^2 \tag{5}$$

From identity (3) it is easy to find the strength of the gravitational field $\mathbf{X}_g = -\mathbf{g}$, if we take into account that for the wave $d\mathbf{Z}_v = Md\mathbf{R}_v = \rho V d\mathbf{r}$:[12]

$$\mathbf{X}_g = -\tilde{n}(\partial U // \partial \mathbf{Z}_m)\tilde{n} = - {}^2\nabla\rho \quad \rho \left(\quad {}^{-2} \right) \tag{6}$$

The energodynamic interpretation of the law of gravity is represented by this statement. It asserts that the gravitational field is an emergent phenomenon that results from the uneven distribution of the density of matter in space. Moreover, as the gravitational force Xg is always directed against the matter's density gradient, отому, its amount and sign can vary depending on the magnitude and direction of the matter's density gradient in a particular region of space.12 In other words, depending on the nature of the mass distribution in space, gravitational forces can be both attracting and repulsive.

This circumstance in no way follows from the law of Newton, who considered gravity in the scalar approximation and considered the interaction force Fg = GmM/R2 independent of their mutual orientation in space. In this case, the gravitational potential ()g g R, ψ= ψi.e. is determined only by the distance R to the center of the "field-forming" mass M. Nevertheless, expression (6) does not contradict it, if this potential g ψis also expressed as a function of density ρ and considered it, like èg, positive. To do this, replace the "test" mass m with a "test" (unit) volume Vc with radius Rc, for which this potential is the same at any point on its surface and is equal to. However, the expression (6) does not contradict him, if this potential g ψalso expressed as a function of density ρ and consider it, like g , Ψpositive. To do this, replace the “test” mass m with a “test” (unit) volume Vc with radius Rc, for which this potential is the same at any point on its surface and is equal to

$$\psi_{\text{g}} = (GV \;/\; R\;)\rho. \quad (7)$$

Hence, taking into account the constancy of the expression in brackets, it follows that the acceleration g = - Xg can be expressed as a function of the density gradient of the medium:

$$\mathbf{g} = (G\rho V_{\text{ñ}} / R_{\text{ñ}})\nabla\rho / \rho = \psi_g \nabla\rho / \rho, \quad (8)$$

Thus, Newton’s law in a continuous medium can also be expressed in terms of a density gradient by the same relation (6), replacing only the proportionality coefficient g Ψby g. ψHowever, now this law has acquired a vector form and has become a consequence of the law of gravity (6) for continuous media in the particular case of pair wise interaction of bodies in empty space. According to this law, with an increase in the density of the medium ρ, all other conditions being equal, the forces Xg weaken, which contradicts the general theory of relativity with increasing curvature with increasing mass. Consequently, the statement of GR, which is the cause of the curvature of space, does not correspond to Newton’s law in the form of (8). At the same time, the laws of gravity in the form of (6) and (8), as well as the energy dynamic identity (3), emphasize that gravity is not the “innate” property of the substance filling the space. This confirms the correctness of R. Feynman, who considered that the force field is not a physical reality, but a mathematical function introduced for its characteristics,13 as well as E. Verlinde,14 protesting against the interpretation of gravity as an inherent property. From the standpoint of energy dynamics, gravity is a consequence of the inhomogeneous distribution of matter in the Universe, caused by the oscillatory nature of its motion. The large-scale gravity waves recently discovered by a number of scientific collaborations15 and the so-called baryon acoustic oscillations of the primary plasma of the Universe16 indicate the wave nature of this process.

Conclusion

The generalised law of gravity’s heuristic utility principally consists in forecasting the presence of gravitational equilibrium, which is indicated by the absence of the consequent force Fg. Laws (6) and (8) show that the prerequisite for the start of gravity, The matter’s density gradient disappears at equilibrium, or zero gravity Fg = Mg = 0:

$$\nabla\rho = 0 \quad (9)$$

regardless of the value of the density itself . ρ

This position also did not follow from the law of Newton, according to which the forces Fg reach zero only at an infinite distance from the field-forming bodies. Meanwhile, the presence of such an equilibrium was evidenced by the phenomenon of libration, when a small celestial body could stay for a long time in the space between the masses without changing its position.

Moreover, recent astronomical studies conducted in the framework of the “large” Sloanovsky digital sky survey (SDSS) have found vast voids in space (“voids”), the density of galaxies and their clusters in which is an order of magnitude lower than their average density.17 This indicates the absence in them of conditions for the formation of stars and their clusters, which according to (8) is the presence of a gradient of their density . ρAnother non-trivial consequence of the energodynamic theory of gravity is the discovery that gravitational forces are hardly inferior in their intensity to intranuclear forces. You can make sure that the gravistatic forces are many orders of magnitude greater than the Newtonian forces of force by comparing the potential 2 16 g ñ 9.10 J / kg Ψ= ≈ with the Newtonian potential g, for example, on the surface of the Sun where it is maximum and equal to 11 g 1,906.10 J / kg. ψ=18 This gives additional arguments in favor of the existence of “strong” gravity.19 The identification of the gravitational component Ug in gravitational energy, which is equivalent to the idea of free energy, is the next non-trivial implication. The so-called “superunit” devices that utilise gravitational energy do not violate the law of conservation of energy because this component can perform work without any movement of celestial bodies (20).

This enables you to examine “excess heat generation” in new light when operating oxygen-hydrogen electrolysers on light and heavy water (at polarisation reversal of nonlinear dielectrics and magnetics; in vortex heat generators; in the recombination of hydrogen; during plasma and plasma-chemical dialysis; with “sonoluminescence”; etc.). As a result, it is also conceivable to provide a more fanciful explanation for the “production” of thermal energy in these facilities using “cold nuclear fusion” rather than by drawing energy from the physical vacuum, which is the state with the lowest energy.

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