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Alternative of the Theory of Relativity

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ALTERNATIVE OF THE THEORY OF RELATIVITY

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I. INTRODUCTION

There have passed 100 years from the moment of emergence of the theory of relativity (RT). Nevertheless still proceeds, a discussion about justice of the postulates which are been its basis and their consequences. Attempts to answer these questions from positions classical and the quantum mechanics (QM) encounter a contradiction with electrodynamics that, actually, and became the reason of deep crisis of theoretical physics.

Search of a compromise between QM and TR will proceed, apparently, beyond all bounds long if "scientific community" doesn't realize that not only the mechanics, but also electrodynamics have to follow as the investigation of the uniform physical doctrine considering quantum mechanics and the theory of relativity as special cases of mechanics of discrete processes and relativistic speeds. To do this, it is necessary to change the research methodology and move on to the deductive method and the system approach, which requires studying the subject of research "from the general to the particular" and "from the whole to the part".

The closest to these requirements is so-called "energodynamics" [1] today. She represents result of consecutive generalization of classical thermodynamics [2] at first on non-uniform environments [3] and non-static (irreversible) processes of transfer of any forms of

energy in them [4], and then – on processes of useful transformation of energy in thermal and not thermal engines. This theory extends the deductive thermodynamic method of researches based on properties of characteristic functions of an object of a research in general [5] to the isolated non-uniform polyvariant systems including all set of the interacting (mutually moving) material objects. At the same time, it does not exclude from consideration any (irreversible or reversible) part of real processes¹. So general approach along with classical concepts of space as a receptacle "all real", does excessive attraction of any postulates SRT and GRT and allows to compare their conclusions with classical thermodynamics which consequences have character of indisputable truths.

II. METHODOLOGICAL FEATURES OF «ENERGODYNAMICS»

Energodynamics as the uniform theory of real processes of transfer and transformation of any forms of energy denies a priority of the hypothetical inertial reference systems (IRS) as in the Universe rotary motion prevails for which there is a preferable reference system. Together with it is denied also the need of record of physical laws for a form, invariant in relation to IRS. This idea is proved only by the fact that "we have no opportunity to be convinced of whether we participate in such movement or not" [8]. Leaning on the same argument, energodynamics puts forward "the principle of absoluteness": *physical laws should be written down in a reference system which doesn't change at course of the studied processes*. Otherwise, obviously, internal (own) energy of U isolated systems as function of her parameters changes with change of a state RS in violation of the law of her preservation. For this reason in classical thermodynamics the temperature T , pressure p and entropy S are measured only in an absolute scale, which zero correspond to full degeneration (disappearance) of the thermal movement [2].

As such "absolute" reference system (ARS) of the power loudspeaker considers any point of the motionless (Newtonian) space occupied by the isolated system and also any material object in him which state remains with an acceptable accuracy invariable during course of the studied process. Such space isn't material and is considered as the scene which is containing in

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1. In contrast to the so-called "pseudo-thermostatics" of W. Thomson [6] or the "quasi-thermodynamics" of L. Onzager [7].

itself all characters, but not participating in the action played by them.

Other feature of energodynamics is the refusal of the concept of hypothetical "conservative" systems accepted in all "classical" theories [9-11]. It is reached by consideration as an object of a research of such set of material objects which with an acceptable accuracy can be considered the isolated system. Her energy remains to U invariable despite the spontaneous nature of all processes proceeding in her that created the known problem of thermodynamic inequalities [2].

Further, energodynamics refuses crushing of non-uniform system on an infinite set of conditionally equilibrium elementary volumes to which the mechanics of continuous media [12], non-equilibrium thermodynamics [13], the theory of a warm mass exchange [14] and some other disciplines resort, obviously or implicitly based on a hypothesis of local equilibrium [15]. Thanks to it energodynamics avoids loss of so-called "backbone communications" which are peculiar to system in general and obviously are absent in each her part. It, by fair recognition of A. Poincare, was the reason "the biggest and deepest shock which was felt by physics since the time of Newton" [8].

At last, energodynamics complements a deductive method of a research (from the general to the particular) with system approach (from whole to a part) that allows her to receive the consequences of the most general character having the same status of indisputable truths, as classical thermodynamics [2]. These methodological features of energodynamics allow her to avoid many paralogisms peculiar to "post-classical" thermodynamics [16].

Being free from hypotheses and postulates, energodynamicstakes as a principle the constructions "axiom legibility" of the processes. In accordance with centuries of experience, it reflects the *opportunity to distinguish by means of all arsenal of experimental means independent processes not only for the reasons of their emergence and character, but also on that special, phenomenologically distinguishable and irreducible to other changes of a condition of system which they cause*. This axiom allows to prove (by contradiction) the theorem according to which number of arguments of own energy U any systems are equal to number of the independent processes proceeding in it.

Thanks to this theorem the general scientific methodological "principle of compliance" acquires more concrete contents and more rigorous mathematical form which prevents attempts to present energy of the isolated system U as missing or excess number of arguments¹⁾.

From here follows, in particular, that if in non-uniform systems processes of redistribution in its volume of the V any extensive sizes Θ_i proceed (the mass of M , the number of moles of k -th substances N_k , their entropy S_k , the charge 3_k , impulse of their relative movement P_k , etc., then along with these parameters needs introduction generally of the same number n of additional parameters of "spatial heterogeneity" Z_i . Such parameters called by us "the moments of distribution of the energy carrier Θ_i " are in power dynamics on situation shift the radius vector of R_i of their center concerning his starting position of R_{i0} in uniform system:

$$Z_i = \Theta_i(R_i - R_{i0}) = \int (\rho_i - \bar{\rho}_i) r dV \quad (1)$$

Here $\rho_i = d\Theta_i/dV$ and $\bar{\rho}_i = \Theta_i/V$ - the local and average density of parameter Θ_i as quantitative measure of the carrier of any i -th form of energy U_i ; $R_i - R_{i0}$ - shoulder of the moment Z_i ; r - the running (Euler) spatial coordinate. As the provision R_{i0} remains invariable at any internal processes in system and coinciding with the center occupied by the isolated system of volume of V , it can be accepted for absolute zero counting of any Z_i parameter.

Thanks to introduction of such "moments of distribution" of $Z_i = \Theta_i R_i$ the classical method of a thermodynamic research of processes on the basis of system parameters as whole manages to be extended also to non-uniform (internally nonequilibrium) systems. At the same time the full differential of internal energy of system U as the sums of "partial" energies of all its i -thforms $U = \sum_i U_i(\Theta_i, R_i)$ can be represented in the form of the identity [1]:

$$dU \equiv \sum_i \Psi_i d\Theta_i - \sum_i F_i dR_i, \quad (2)$$

where $\Psi_i \equiv (\partial U / \partial \Theta_i)$ is the volume-averaged value of the generalized potential of the system ψ_i (the absolute temperature T and pressure p , the gravitational potential ψ_g , the chemical μ_k and the electric ϕ_k potential of the any k -th substances, the components v_k of the relative velocity \mathbf{v}_k of their displacement, etc.); $F_i \equiv -(\partial U / \partial R_i)$ - forces in their all-physical understanding; $i = 1, 2, \dots, n$ is the number of independent forms of energy of all components or a phase of the system.

In isolated systems, the identity (2) vanishes, reflecting the law of conservation of their energy. In the particular case of homogeneous (internally equilibrium) systems (where $dR_i = 0$), it goes over to the generalized equation of the first and second principles of the equilibrium thermodynamics of complex (multivariant) systems [2]. Such a form emphasizes the conservation of the energy of the system when it is exchanged with the environment in the form of heat $\delta Q = T dS$, the expansion work $\delta W_p = p dV$, the work of inputting the any k -th substance $\delta W_k = \mu_k dN_k$, its charge $\delta W_e = \phi_k d3_k$, and so on.

1. In particular, this is the hypothesis of local equilibrium, which justifies the description of a nonequilibrium system by the same variables as in equilibrium; the theory of "hidden variables"; the concept of an "orientable point", etc. This is the source of most of the methodological errors of modern theories [1].

In the isolated systems the identity (2) vanishes in zero, reflecting conservation law of their energy. In that specific case uniform (internally equilibrium) systems (where $d\mathbf{R}_i = 0$) it passes into the generalized equation of the 1st and 2nd beginnings of equilibrium thermodynamics of difficult (polyvariant) systems [2]. At the same time members of the first sum (2) gain sense of elementary heat exchange $\delta Q = TdS$, expansion works $\delta W_p = pdV$, works of input of any k -th substance $\delta W_k = \mu_k dN_k$ or his charge $\delta W_e = \phi_k d\mathcal{Z}_k$, etc. We combine all these kinds of influences into one category of disordered works δW_i^n , since they are not connected with overcoming the resulting \mathbf{F}_i internal forces:

$$\delta W_i^n = \Psi_i d\Theta_i, \tag{3}$$

The work described by the second sum (2) has a fundamentally different character:

$$\delta W_i^e = \mathbf{F}_i \cdot d\mathbf{R}_i = \mathbf{X}_i \cdot d\mathbf{Z}_i, \tag{4}$$

It is distinguished by the presence of the resultant \mathbf{F}_i and is related to the directional displacement $d\mathbf{R}_i$ of the energy carrier Θ_i in the process of its redistribution through the system and therefore is in the energodynamics by the ordered work δW_i^e . It is this category of work that is considered in mechanics, electrodynamics, and thermodynamics of irreversible processes (TIP) [17]. In this case, the basic for the TIP concepts of the flow \mathbf{J}_i acquire a sense of an impulse of the energy carrier Θ_i :

$$\mathbf{J}_i \equiv d\mathbf{Z}_i/dt = \Theta_i d\mathbf{R}_i/dt = \Theta_i \mathbf{v}_i, \tag{5}$$

and "the thermodynamic force"

$$\mathbf{X}_i \equiv -(\partial U/\partial \mathbf{Z}_i) = -\Theta_i^{-1}(\partial U/\partial \mathbf{R}_i) = \mathbf{F}_i/\Theta_i, \tag{6}$$

– sense of tension of the field of temperatures, pressure, chemical, electric, gravitational etc. potential.

Such a generalization of the law of conservation of energy by the identity (2) makes it possible to carry out the synthesis of classical thermodynamics with mechanics and other disciplines that operate with the concept of force \mathbf{F}_i and obtain the most important principles, laws and equations of these disciplines as consequences of energodynamics [18].

III. GENERALIZATION AND UNIFICATION OF THE CONCEPT OF FORCE

Theory of Relativity (TR) and quantum mechanics (QM) have abolished a concept of force, fundamental for a number of basic disciplines, as the causes of this or that process. At the same time TR has attributed the reason of their emergence for curvature of space, and QM has gone further away, having changed a concept of work as quantitative measure of process of

power transformation for exchange interaction. In standard model this interaction is carried out by emission and absorption of bosons (elementary particles - interaction carriers). As their properties in process don't change, exchange interaction can carry out only the power transfer described by the 1st sum of identity (2), but not the transformation of energy demanding presence of forces of \mathbf{F}_i and change of the energy carrier from any i -th on j -th. Thereby TR and QM have ceased to perform the most important function of science – to explain these or those phenomena. Already one it deprives of the bases of their claim to be a basis of fundamental disciplines.

Otherwise the situation with ergonomics which develops is and deepens idea of forces. Though from her positions action is always equal to counteraction, his result depends on that what forces of the nature counteract the applied (active) force \mathbf{F}_i^a . If force of reaction \mathbf{F}_i^r has the same i -th nature ($\mathbf{F}_i^r = -\mathbf{F}_i^a$), the system remains in balance. Such is, for example, force of reaction of a support. However if among the counteracting forces of reaction there are forces other, j -th nature, for example, dissipative force \mathbf{F}_j^d , then there is a transformation of i -th form of energy U_i into U_j corresponding to it. There of the total force of $\mathbf{F} = \mathbf{F}_i + \mathbf{F}_j$ becomes the power transformation process reason. Thanks to it ergonomics gains ability to distinguish ordered work of W_i^e as a quantitative measure of process of transformation of energy from the disordered work of W_i^n as a quantitative measure of process of her transfer. More clear is also a sense of the 1st and 2nd sums of identity (2).

According to identity (2), any force of \mathbf{F}_i is determined by a uniform image as derivative of energy of system U by the corresponding parameter of spatial heterogeneity of system (1). Such is, in particular, force of inertia \mathbf{X}_v , defined as derivative of kinetic energy $U_k = M\mathbf{v}^2/2$ on the moment of distribution of mass of $\mathbf{Z}_m = M\mathbf{R}_m$, that taking into account $d\mathbf{R}_m = d\mathbf{r}$ leads to expression [1]:

$$\mathbf{X}_v = -\partial U^k/\partial \mathbf{Z}_m = -\mathbf{v} \cdot \nabla \mathbf{v} \tag{7}$$

This expression indicates specifications of a concept of acceleration, which is determined in Newton's mechanics as full derivative of speed \mathbf{v} by time t . For this purpose we will present to $d\mathbf{v}/dt$, as usual, in the form of the sum local $(\partial \mathbf{v}/\partial t)_r$ and a convective component $(\mathbf{v} \cdot \nabla) \mathbf{v}$. As to accelerate a body, without moving it in space, it is impossible, $(\partial \mathbf{v}/\partial t)_r = 0$, and $\mathbf{a} = (\mathbf{v} \cdot \nabla) \mathbf{v} = \nabla(v^2/2)$. Therefore, in Newton's mechanics it would be necessary to understand any increase in kinetic energy of a body including connected with acceleration of rotary motion as acceleration. It follows also from expression a speed vector gradient $\nabla \mathbf{v}$ as

tensor of the second rank which includes a vortex component. Mean while still accelerated call also uniform rotation of a body, meaning change of the direction of speed and so-called "centripetal acceleration", mistakenly predicting on this basis inevitable falling of an electron on an atomic nucleus.

Offered by energodynamics unification of a concept of force results in understanding that any force field of $\mathbf{F}_i(\mathbf{r})$ or $\mathbf{X}_i(\mathbf{r})$ is generated not by the masses, charges or currents in itself, and their uneven distribution in space. At the same time becomes obvious that not scalar, vector or tensor fields as functions of their distribution in space [18], and their carriers are material. It isn't less important that distribution of a concept of force on the phenomena of any nature allows to carry out synthesis of classical and nonequilibrium thermodynamics with the mechanics and other disciplines operating with a concept of force \mathbf{F}_i and to receive the major principles, laws and the equations of these disciplines as a result of energodynamics [19].

IV. INCOMPATIBILITY OF THE NEWTONIAN AND RELATIVISTIC UNDERSTANDING OF THE MASS

According to the all-physical principle of compliance, I. Newton's mechanic should consider a special case of power dynamics in the annex to rectilinear motion of bodies. At such (deductive) approach the mass of M should be considered one of energy arguments that quite corresponds to her Newtonian understanding as as "measures of amount of matter proportional to density and its volume" [9]. It is easy to notice also that the definition of force given by Newton

$$\mathbf{F} = d\mathbf{P}/dt = M\mathbf{a}, \tag{8}$$

is a consequence of expression of $\mathbf{F} = -M\mathbf{X}_v(7)$ in the conditions of constancy of mass of M put in expression of an impulse $\mathbf{P} = M\mathbf{v}$ and private derivative $\partial U^k/\partial \mathbf{R}_m$. Thus, the law of force (8) didn't determine the size \mathbf{F} as inertia force at all, and the interpretation of coefficient of proportionality between force and acceleration of M as measures of inertial properties isn't proved at all. (8)

On the other hand, the mechanic Newton it was limited to consideration of conservative systems, i.e. I neglected dissipation. In this regard she really demands adjustment as expression (8) assumes that acceleration \mathbf{a} is the only consequence of action of active force of \mathbf{F} . In that case the proportionality coefficient between it and the speed of change of an impulse of $d\mathbf{P}/dt$ in (8) is equal to unit and could be lowered. However from positions of nonequilibrium thermodynamics of polyvariant systems any thermodynamic force of \mathbf{X}_i generates all possible \mathbf{J}_j streams in it. It is considered by record of phenomenological laws in the form of [7, 13, 15, 17]:

$$\mathbf{X}_i = \sum_j R_{ij} \mathbf{J}_j, \tag{9}$$

where R_{ij} are the so-called phenomenological coefficients characterizing the resistance of any i -th force from the j -th stream side.

It is possible to show that for each of members of the sum (9) these coefficients are the efficiency functions η_j the corresponding process of transformation of energy which can be determined as power relation $N_j = \mathbf{F}_j \cdot \mathbf{J}_j$ at the converter exit to power $N_i = \mathbf{F}_i \cdot \mathbf{J}_i$ on his entrance:

$$\eta_j = N_j/N_i = \mathbf{F}_j \cdot \mathbf{J}_j / \mathbf{F}_i \cdot \mathbf{J}_i. \tag{10}$$

If to accept according to Newton's law (8) $\mathbf{J}_j = d\mathbf{P}/dt = \mathbf{F}_j$ and $\mathbf{J}_i = \mathbf{F}_i$, then $\eta_j = (\mathbf{F}_j/\mathbf{F}_i)^2$, and the thermodynamic form of this law takes a form:

$$\mathbf{F}_i = \eta_j^{-1/2} d\mathbf{P}/dt. \tag{11}$$

Expression (11) considers inevitable losses in the course of acceleration of a body (irreversibility of this process). It is fair for any converter of energy including for the accelerator of charged particles. Then becomes obvious that with approach by the speed limit of distribution of indignations in any environment (in this case to velocity of light c) when $d\mathbf{P}/dt \rightarrow 0$, coefficients $R_{ij} \rightarrow \infty$, and $\eta_j \rightarrow 0$.

The vanishing of the efficiency of the acceleration process is due to the fact that when the limiting speed of the material object is reached, no force \mathbf{F} can lead to its further increase any more. In accelerators of charged particles this corresponds to the attainment by the particles of the limiting velocity, when all the power supplied to them is expended on replenishment of losses. This provision fully applies to Kaufman's experiments on electron acceleration [20], explaining the apparent increase in mass by a decrease in the efficiency of the acceleration process.

Thus, with growth of speed the acceleration process efficiency, but not accelerated mass changes. It is especially easy to be convinced of inadmissibility of relativistic change of mass with a speed v from positions of conservation law of mass of the isolated system. Whatever processes happened in such system, including processes of relative acceleration or braking of components of system, their mass remains invariable. Therefore, dividing it into "rest mass" and "relativistic", "inertial" and "gravitational", "longitudinal" and "transverse", "electromagnetic" and any other is equivalent to substituting the law of conservation of energy with the law of "interconversion" of the masses.

V. INCONSTANCY OF LIGHT SPEED

The postulate on constancy of velocity of light in emptiness returns us by Epicurus's times when existence of space, free from the material media was supposed. However this assumption doesn't maintain criticism from positions of modern knowledge. Really, if

in space there are though any material objects exchanging among themselves radiant energy, then it isn't "empty" any more. Moreover, kind of we imagined the radiation carrier – the ether, a physical vacuum, the electromagnetic field, gas of photons, the hidden matter, etc. – he also fills this space. In any case, we can't exclude the intergalactic environment in which this light actually spreads from consideration. Besides the fact of a curvature of a trajectory of beams known since the time of D. Michel (1783), demonstrates change of the direction of a vector of speed. In that case and the movement of rays of light it would be necessary to consider accelerated, as well as any other curvilinear movement. From this point of view even the phenomenon of "gravitational lensing" recognized GRT testifies against a postulate on constancy of velocity of light.

At such formulation of the question the contradiction of the mentioned postulate to experimental data and theoretical representations whatever (wave or corpuscular) we adhered to the concept is found at once. Really, according to the theory of fluctuations [21] confirmed in huge number of cases, a square of speed of distribution of indignations (in this case velocity of light c) is determined private energy of elastic deformation of the environment of distribution of indignations, derivative of density, ρ_u by its density ρ :

$$c^2 = \partial\rho_u/\partial\rho. \quad (12)$$

This derivative is equivalent to a private derivative ($\partial U/\partial M$) in identity (2) which is defined in the conditions of constancy of all other arguments of energy of U , including system V volume. Therefore expression (12), as well as identity (2), is fair for any material environments having elasticity. However, this partial derivative can't be considered "a priori" not depending on density and other parameters of the intergalactic media especially in conditions when the local density of this Wednesday changes on many orders. This speed and from positions of the corpuscular theory of light as in her she depends on the frequency of "collision" of these corpuscles, and taking into account existence in this environment of material bodies – and from duration of process of reradiation, i.e. eventually from environment density can't be considered as a constant. Thus, the assumption of constancy of velocity of light contradicts the representations which have developed for centuries and it can't be accepted without proofs.

Even more serious is the contradiction of a postulate of A. Einstein on limitation of speed of distribution of indignations in any environments of velocity of light in a page vacuum. This postulate obviously contradicted data of Laplace (1805) who on the basis of the fact of stability of solar system has for the first time shown that the speed of distribution of

gravitational ("Newtonian") interaction can't be lower than $5 \cdot 10^7$ speeds of light [22].

In 1948 the Russian astrophysicist N. Kozyrev has found existence in the Universe of the radiation getting through the closed metal shutters of the telescope and the object advancing the optical image [23]. In the 90th years this result has been confirmed by group of researchers of RAS [24].

Other phenomenon illustrating a possibility of speeding of light was the so-called "tunnel effect" [25]. Moreover, in [26] it is reported about an experiment in which the laser beam went out of the camera with cesium vapors still before he has entirely entered it. This phenomenon is interpreted as a result of "saving of time" due to the choice of the shortest way.

Within the last decades the XX centuries in far space of radio - and x-ray telescopes many objects (quasars and galaxies) which throw out substance streams with a speed exceeding velocity of light several times are revealed. Now there are data confirming excess by gravitation of velocity of light on 11 orders and more. In a number of cases, the "superluminal" velocities could even be measured [27].

There is no lack of data and on inconstancy of velocity of light. In the 50th years the founder of astrospectroscopy A.A. Belopolsky has opened that the light spectrum is displaced near bright stars that demonstrated change of speed of electromagnetic waves depending on properties of the environment [28]. The interstellar dispersion of speed of electromagnetic waves found by him has also been repeatedly confirmed further. It turned out that EM-waves with a frequency below 100 KHZ have speed significantly below than size of $3 \cdot 10^8$ m/c.

In the 60th years inconstancy of velocity of light has been confirmed at a radar-location of Venus. In the conditions of an error of the radar of $\pm 1,5$ km and the maximum error of an experiment because of rotation of Earth in 260 km the actual variability of data of measurements of velocity of light on different sites of her orbit was 2000 km. [29].

In 2016 all scientific world has been shocked by opening of R. Santilli who has designed the telescope with concave lenses and has received with his help repeated images of the same star in different points of an orbit in the form of "a pearl necklace" because of distinction of speed of distribution of radiation [30].

It isn't less certificates and delay of light. In 1982 the Australian scientific B. Setterfield has paid attention to monotonous decrease of the measured light speeds within the last 300 years [31]. Other strange thing was found by means of the «MAGIC» telescope by the international group of researchers of the galaxy "Markarian 501". Astronomers "have sorted" the gamma photons arriving from there with each flash on low - and high-energy and have found out that at the simultaneous

radiation high-energy particles arrive with lateness about 4 minutes [32].

In 1999, "Natura" published a scientific article detailing the experiment, in which the speed of light was reduced to 17 meters per second [32]. Nevertheless, the "scientific community" continues to persist in not recognizing an environment that is not reducible in its properties to ordinary (baryon) matter, preferring to it a "void" covered with a fig leaf of "physicality".

VI. THE NONEQUIVALENCE OF MASS AND ENERGY

According to the relation (12), which follows from the theory of oscillations, the square of the propagation velocity of perturbations in elastic media is determined by the partial derivative of the energy density ρ_u of this medium with respect to the density of this medium ρ itself. This means that this derivative depends in principle on all other arguments for the energy of this medium, including its density ρ , temperature T , composition, and so on. Only for media in which the density ρ is the only state variable, the partial derivative $(\partial\rho_u/\partial\rho)$ goes over into the total $d\rho_u/d\rho$, the integration of which, taking $E = \int \rho_u dV$ and $M = \int \rho dV$, leads to expression

$$E = Mc^2. \tag{13}$$

Such a luminiferous medium in the representation of the physicists of the nineteenth century was the ether as an elastic medium possessing a nonzero density ρ whose oscillations propagate at the speed of light c . Therefore N. A. Umov back in 1874, on the basis of the law of conservation of energy and mass of the system consisting of a radiating body and ether, related the decrease in the total energy of the body dE and its mass dM in the process of radiation with increasing kinetic energy of the ether $dE_k = (1/2)c^2 dM$, the relationship between them of the form [34]:

$$E = Mc^2/2. \tag{14}$$

W. Thomson in 1881 derived a similar expression $dE = (3/4)c^2 dM$, taking into account the ideas of that time about the existence of an "electromagnetic mass" of electrons [5]. The expression currently used

$$E = Mc^2. \tag{15}$$

was obtained by O. Heaviside (1890) on the basis of the concept of the flux of radiant energy in ether as the product of the light pulse $P = Mc$ by its velocity c [35]. To the same conclusion came A. Poincaré (1900) and F. Hasenohrl (1904).

A. Einstein in 1905 extended this expression to any form of energy, postulating the constancy of the speed of light and calling expression (17) "the principle of equivalence" of mass and energy [36]. According to

him, anybody with energy E (including a photon) has a mass $M = E/c^2$, which grows not only with increasing kinetic energy of the material system, but also with any form of its rest energy E_o . Conversely, an increase in any form of energy of the system E entails an increase in its mass M . In this connection, the concepts of the "relativistic mass" M_p , "rest mass" M_o , "inert", "electromagnetic", "gravitational" etc. masses.

This classification is based on the use of the Planck system of units (where $c = 1$), which makes each form of energy U_i equivalent to the mass M_i of its energy carrier Θ_i . Meanwhile, it is known that any form of energy has a quantitative and qualitative measure, i.e. is characterized not only by the value of Θ_i , but also by the corresponding potential ψ_i , so that the equivalence of the energy E to the mass M does not yet imply the equivalence of $U_{i/2}$ to the mass M_i . This circumstance reveals the complete inconsistency of the substitution of the additivity of the partial energies U_i by the additivity of their masses M_i .

A different conclusion follows from the energy dynamics of isolated systems. It proceeds from the premise that all forms of the ordinary (baryonic) matter of the universe are the product of the "condensation" of non-baryonic (hidden, unobservable) matter, no matter what we call it - ether, electromagnetic field, physical vacuum, photon gas, etc. This immobile material medium has a single (gravitational) form of energy, which depends on its density ρ . For such a medium, the partial derivative $\psi_m = (\partial U/\partial M)$, which determines the gravitational potential of the system, goes over into the total derivative $\psi_m = dU/dM$, its integration leads to the expression

$$U = \psi_m M. \tag{16}$$

Since in the isolated system $U = E_o$ and $M = M_o$, under the conditions of volume constancy $(\partial U/\partial M) = (\partial \rho_u/\partial \rho) = c^2$, expression (16) can be written in the form

$$E_o = c^2 M_o. \tag{17}$$

To this expression, an increasing number of researchers are now inclined, believing, however, the speed of light with a constant [37]. The mass in this expression does not change with velocity, becoming Einstein's measure of the stored energy of the body. However, in the more general case of an intergalactic medium as a carrier of light, the rate of propagation of perturbations (oscillations) in it in accordance with experiment becomes different, which leads to a violation of the principle of equivalence of mass and energy.

VII. THE NON-GEOMETRIC NATURE OF GRAVITY

According to the identity (2), not only gravitational forces, but also any other forces disappear

under a uniform energy distribution in space. This is also true for velocity fields, as follows from (8). Let us show now that it does not contradict the law of Newton gravity $F_g = GmM/R^2$, according to which the gravitational potential ψ_g at a distance R from the center of the "field-forming" body of mass M is determined by the expression:

$$\psi_g = -GM/R, \tag{18}$$

where G is the gravitational constant.

Since in the intergalactic space with a continuously distributed mass there are neither "field-forming" M nor "test" masses $m \ll M$, we consider the sphere of unit volume V_o with radius R_o and mass $M_o = \rho V_o$. For it, the potential (15) at any point of its surface is equal to:

$$\psi_{g_o} = -(GV_o/R_o)\rho. \tag{19}$$

From (19), in view of the constancy of (GV_o/R_o) , it follows that the acceleration of the gravitational field $\mathbf{g} = -\nabla\psi_g$ can be represented as a function of the density of the intergalactic medium:

$$\mathbf{g} = (GV_o/R_o)\nabla\rho = \psi_{g_o}\nabla\rho/\rho, \tag{20}$$

where $\psi_{g_o} = G\rho V_o/R_o$ is the Newtonian gravitational potential on the surface of a sphere of unit volume, equal in the system SI $\sim 10^{-34} \text{ m}^2 \text{ s}^{-2}$.

A similar conclusion about the proportionality of the acceleration g to the relative density gradient of the medium $\nabla\rho/\rho$ follows from the energy dynamics. Indeed, in accordance with the identity (2) for $d\mathbf{R}_m = -d\mathbf{r}$, the gravitational force \mathbf{F}_g is determined by the gradient $(\partial U/\partial \mathbf{r})$ of the energy $U = c^2\rho V_o$ and is equal to $c^2V_o\nabla\rho$. In this case, $\mathbf{F}_g/V_o = \rho\mathbf{g} = c^2\nabla\rho$, and we arrive at the modified form of Newton's law [38]:

$$\mathbf{g} = c^2\nabla\rho/\rho. \tag{21}$$

Comparing expressions (20) and (21), we find that for an intergalactic medium with an average density $\rho \sim 10^{-24} \text{ kg m}^{-3}$, the acceleration of the gravitational field, determined by expression (21), is at least 40 orders of magnitude greater than that found from Newton's law in form (20). This is explained by the fact that Newton's law of gravitation takes into account only the pair interaction of gravitating bodies, while (21) takes into account the interaction of all structural elements of non-baryonic matter. Thus, the modified Newton's law (21) confirms the presence in the intergalactic space of a gravitational field that is not inferior in intensity to the field of internuclear forces. The latter testifies to the unity of the nature of "strong gravity" and "strong interaction".

The origin of gravity resulting from energy dynamics as a consequence of the uneven distribution of matter in space was confirmed by recent studies of

240 galaxies of various types, according to which the distribution of ordinary (baryonic) matter in them is closely correlated with gravitational acceleration [39]. Along with the discovery of "strong gravity," this explains many of the processes observed in the universe: amplification of inhomogeneities in the gravitational field ($\nabla\rho \neq 0$) upon their spontaneous generation; the presence of baryon acoustic oscillations in the intergalactic medium [40]; the presence in the Universe of vast regions (voids) free of baryonic matter (which is due to "gravitational equilibrium" ($\nabla\rho = 0$), that is, the absence of conditions for densification of the intergalactic medium, the ordered distribution of clusters of galaxies in the form of concentric circles [41]; their expansion with predominance of repulsive forces ($\nabla\rho < 0$); condensation of regions with predominance of gravitational forces ($\nabla\rho > 0$); formation in areas of increased density of gas-dust clouds, nebulae, stars, galaxies and their clusters; formation of "black holes" from non-baryon (unobservable) matter in the centers of galaxies; the emergence of "jets" when baryon (radiating) matter appears in them; the presence of a non-visible halo at the periphery of galaxies; the nature of their rotational curves; gradual weighting of planets as accretion of interstellar matter accreted to them; flow in the depths of stars of thermonuclear reactions; gradual weakening of gravitational forces as the stars become denser; the explosion of "supernovae" when the internal pressure in the stars exceeds the gravitational forces and much more [42]. All this distinguishes the energodynamic theory of gravity from general relativity, which generates more riddles than answers.

VIII. DISCUSSION OF RESULTS

It is known that the principle of relativity of Galilei (1632) claimed that the uniform and rectilinear motion of one system of material bodies is relative another doesn't affect the course of the mechanical processes happening in them at all. material systems. It is easy to notice that in essence this principle is reflection of indistinguishability of a condition of rest or the movement of system "by inertia" when she is affected by no forces, and her parameters \mathbf{P} and \mathbf{R}_m remain invariable.

Absolutely other business if to adhere to the principle of legibility of processes and to use motionless RS in which these states are obviously distinguishable ($\mathbf{P} = 0$). Newton also adhered to this position, claiming that "any body continues to keep at rest or the uniform and rectilinear motion, so far and as it isn't forced by the applied forces to change this state" [9].

Therefore, the main point in what task is set for himself by the researcher: to distinguish processes for the purpose of their subsequent studying, or to make them indiscernible to subordinate to the theory of groups. The mathematician A. Poincare has preferred

the last option and in 1895 has extended the principle of relativity (i.e. indistinguishability) to the electromagnetic phenomena. It is quite natural that in inertial RS physical laws will have the same appearance. However, this does not follow at all that these laws have to be submitted so that the studied phenomena were indiscernible. On the contrary, all centuries-old experience prompts that these laws should be written down in such SR in which they look more simple and understandable.

Meanwhile A. Einstein in 1905 has preferred an opposite way and after A. Poincare has extended his postulate of relativity on all phenomena of nature. In so doing, he put in the basis of the special theory of relativity (STR) a postulate on independence of velocity of light of the direction of his distribution in space and from the movement of his sources, without having attached significance to the fact that it and is recognition of its absoluteness.

Soon he has formulated the principle of local indistinguishability of gravity and forces of inertia, having called it the principle of equivalence of inertial and gravitational masses and having put it in the basis of the general theory of relativity (GTR). Then the principle of indistinguishability of the accelerated and rotary movements which has allowed to approve indistinguishability of dynamic effects of acceleration and inclination in not inertial reference systems has joined him.

So the Galilean thesis about indistinguishability of rest and the uniform rectilinear motion in own reference system became the initial principle of theoretical creation of all physics and criterion of "scientific character" of a research. In electrodynamics this was expressed in principle indistinguishability of electrons in metal; in physics of elementary particles – in principle indistinguishability of identical particles; in KED – in indistinguishability of substance and the field; in the uniform theory of the field – in a statement about merges together (up to full indistinguishability) at least three of four known types of interaction. As a result, the known idea of Leibniz about absence in the nature of two absolutely identical things has been forced out by his antipode - the principle of indistinguishability. His postulation has made understanding of physical processes optional and considerably illusory that eventually has led to not distinction of the truth and delusions.

It would seem, along with Newton's mechanics which was really needing correction at least in view of prevalence of rotary motion, there was thermodynamics about which A. Einstein spoke as of the only theory of the general contents which investigations never and will be disproved by nobody. From it, on the basis of the principle "self-destructive of equilibrium" (its "zero start" [2]), there followed the existence of a single ("absolute") SR satisfying the law of conservation of energy when it

was exchanged between the system and the environment. However, with the approval of A. Einstein, it was also subjected to revision in relativistic thermodynamics, which led to a number of paralogisms [16]. This became evident only from the standpoint of energodynamics as a "theory of absoluteness" and the successor of thermodynamics. In this regard energodynamic approach to a problem of gravitation is the alternative deserving attention TR marking return of physics on the classical way of development.

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