New scientific paradigm and gravity

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«*Only crazy ideas can become true*» Niels Bohr

Abstract

The phenomenon of gravity can be cognized and used only on the basis of *a new scientific paradigm*, in which our world, the *moving Cosmos, is the only entity that unites everything*. Abstract categories, space, time, matter, etc. invented to describe the motion of the Cosmos, which has only one absolute property — to exist in motion, which is a non-mechanical periodic oscillating process of spherical *convergence-divergence* (concentration-dispersion) of *matter-Cosmos* (CDMC) according to the Hubble factor. There is neither long-range action nor short-range action. The movement of matter as a result of energy-mass induction, a material flow that forms a tensor dynamic *material-energy field* (MEF) with a difference in energy potentials, creates *tension-acceleration* on equipotential surfaces around material bodies, which determines the gravitational movement of matter.

«*The heavens* [Cosmos][1] *...contains the cause for its movement...*»
[Aristotle, 60, «On the Heavens» p.309]

«*The cause of motion and rest* [of bodiesis] *the same as that of the existence of bodies*»
[G. Berkeley, «De Motu; On the Principle and Nature of Motion», &34]

The phenomenon of gravity, along with other unsolved problems of modern physics, can be cognized and used only on the basis of a *new scientific paradigm* described below.

Our World, the Universe — *the Cosmos*, which is absolutely everything, is one, infinite and eternal. The Cosmos is the only absolute physical entity. The Cosmos is an object and a subject, a conductor and a current, a moving body and a motor all rolled into one.

Developing the idea of Minkowski: «*Henceforth* [matter by itself, consciousness by itself]*, space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of* [all four] *will preserve an independent reality*» [1]

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[1] author's notes

Abstract categories such as space, time, matter, consciousness, energy, physical fields, «dark matter» (DM), «dark energy» (DE), etc., do not have their own entity and are accepted by people to describe World.

There is nothing absolute in the Cosmos, except for one property - to *exist in motion*.

Motion, like any change, is a way of the existence of the Cosmos. In the process of scientific cognition, it is necessary to describe the movement of the Cosmos, i.e. atoms, bodies and fields not as immutable substances, but as a physical periodic oscillatory process of the formation, existence and transformation of the matter. We can reflect the movement of the Cosmos in consciousness *as the movement of energy.*

Energy is an integral of the motion of the Cosmos, a quantity that is conserved, according to Noether's theorem, when moving in a closed system in isotropic and homogeneous space and time. The law of conservation of energy is an absolute law of nature.

We describe the motion of the Cosmos not as force interactions of bodies, charges, particles, fields, not as the gravity of material bodies, as Newton, and not as changes in the geometry of space-time, as Einstein, but as internal changes in energy characteristics in the Cosmos, as a *non-mechanical movement* of the MEF *in Euclidean three-dimensional space and three-dimensional time* in the system of *dimensions of physical quantities* LT (m, s). The LT system reveals the fundamental meaning of physical processes, for example, the Hubble parameter H_0 describes the rate of formation of baryonic matter (BM), or material current per unit volume per unit time, and has the dimension m^3s^{-3}, mass - m^3s^{-2}, energy potential - m^2s^{-2}.

The Cosmos is *absolutely non-local*, it occupies everything and has nowhere to move mechanically. Einstein, when constructing the special theory of relativity, excluded the mechanical properties, Lorentz's immobility aether, as contradicting the principle of relativity, while preserving, its physical properties for the general theory of relativity. Developing the ideas of Einstein, the new theory recognizes the absence of mechanical properties of matter.

The only general observable factor of the motion of the Cosmos — Hubble parameter $H_0=1/t_0$ (t_0 - age of the Universe), determining the movement of all derived processes, such as the formation and movement of BM, the birth and development of consciousness and all others [13]. There is no need for the "Big Bang" hypothesis. The energy density of CMB is equal to the energy density of the convergence-divergence of all atoms in the Cosmos [6,7].

The only fundamental physical process, the movement of the Cosmos, is a volumetric, periodic, oscillatory, spherical *convergence-divergence* of the only physical substance of the *Cosmos* (CDMC). DM is the mass in the CDMC process. All other processes and interactions, such as gravitational, electromagnetic, strong and weak, are derivatives of this process. There is neither long-range action nor short-range action in Cosmos.

The density BM ρ_{bm} in *spherical volume* $1m^3$ in the process of convergence is equal to the volume derivative of H_0^3 (in 3 directions of space in a spherical volume):

$$\rho_{bm}=\left(H^3\right)'=\frac{dH^3}{dV}=3H^2 \qquad (1)$$

The cause for the movement of matter is the difference in energy potentials arising from the convergence of matter. Energy potential of matter is determined by the potential energy of a unit of matter at a given point $\Delta\varphi_0=\varphi_1-\varphi_2=E/m=c^2$, whence

$$E=m(\varphi_1-\varphi_2)=m\Delta\varphi_0=mc^2, \tag{2}$$

where $m=\rho_{bm}V$–matter, V-volume, $\varphi_1-\varphi_2=\Delta\varphi_0$ - difference in energy potentials.

Total *energy density of motion* BM, DM, DE + neutrino = $\sum\rho_e$ in a unit of volume per time $t_0=1/H_0$, taking into account the data of the space mission "Planck"

$$\sum\rho_e=4\rho_{edm}=16\pi H_0^2 c^2 \qquad [11, 12, 13] \tag{3}$$

where ρ_{edm} - energy density DM, c–speed of light.

Power Cosmos N *absolute physical invariant* in Planck system of units

$$N=\frac{dE}{dt}=\frac{h}{t_P} \tag{4}$$

Cosmos motion energy in volume $1m^3$ in 1s, i.e. power τ:

$$\tau=\sum\rho_e t_0=16\pi H_0 c^2 \text{- constant [13]} \tag{5}$$

Planck constant h:

$$h=\tau\, t_P=\frac{32\, H_0^2}{c}=16\pi Hc^2\frac{\tau}{8\,\pi^2 c^5}=\frac{\tau^2}{8\,\pi^2 c^5}=m_P\frac{\tau}{4\pi c^3}\ , \tag{6}$$

where m_P–Plank mass.

We opened relationship between all fundamental constants — Planck constant h, Hubble constant H_0, age of the Universe t_0, speed of light c, fine-strukture constant α, Rydberg R_∞, gravitational constant G, Boltzmann constant k, temperature CMB T_r in K and etc. [17]:

$$hc=32H_0^2=32/t_0^2=\rho_e t_0 t_P c=\rho_e t_P c/H_0=H_0\alpha\varepsilon_r c=\alpha\varepsilon_r c/t_0=R_y/R_\infty=H_0\alpha cnkT_r=4\pi G\lambda_{max}\alpha_W kT_r \tag{7}$$

where hc-speed of transmission of action, t_P - Plank time, $\varepsilon_r=nkT$- energy density CMB, R_y–Rydberg — unit of ionization energy of a hydrogen atom, λ_{max}–CMB wavelength with maximum intensity in m, v_{max}–CMB wave frequency in s^{-1}, $4\pi G$ -conversion factor from LT to MLT dimension system, α_W- constant Wien's.

The motion of matter M in the CDMC process with the density of the energy of motion ρ_e and with the oscillation period t_p, is described by the Gauss's divergence theorem as the motion of the energy during the convergence of energy E in volume V bounded by a closed surface of area S with radius R with tension-acceleration a:

$$\oiiint_V divE dV =\oiint_S a\, dS= \iiint 4\pi\rho_e\tau dV=\iiint 4\pi\rho_e h/t_p dV=\iiint 4\pi\rho_e\rho_e/H dV=\iiint 4\pi G\rho dV=\iiint 4\pi GM \tag{8}$$

The proton is «eternal», because it is periodically formed anew during the time t_p (Fig.1):
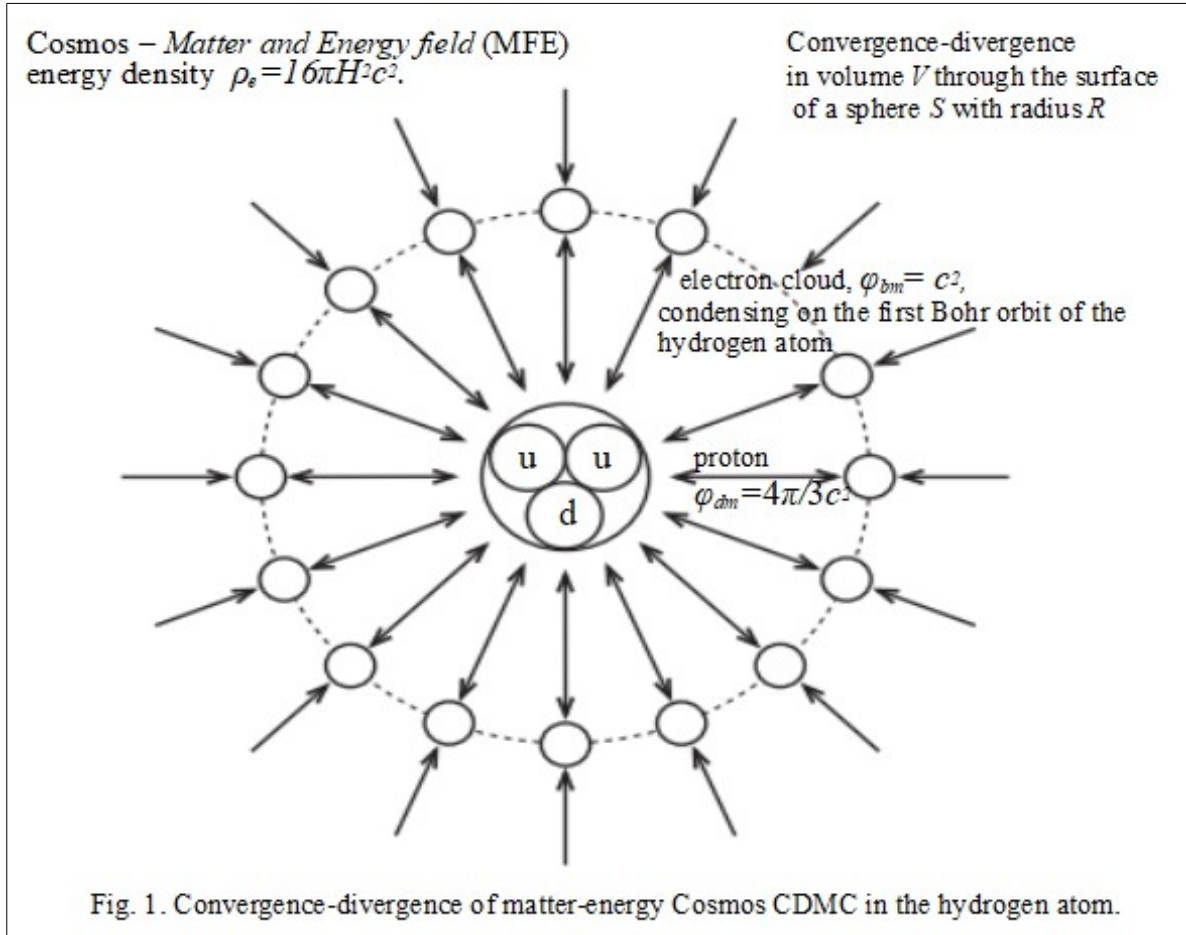

Fig. 1. Convergence-divergence of matter-energy Cosmos CDMC in the hydrogen atom.

Principle of relativity — the absolute principle. The movement of matter is a change in the relative energy characteristics of Cosmos due to the CDMC process forms relative differences in energy potentials on equipotential surfaces:

$$\Delta\varphi=\varphi_0-(\varphi_0-\Delta\varphi)=c^2-(c^2-\Delta\varphi)=m\mu/4\pi R=m16\pi H_0c^2t_p/4\pi Rh=m\tau t_p/4\pi Rh=m\tau/4\pi RN=Gm/R=v^2 \quad (9)$$

where v - is the speed of the body, v^2 - the difference of energy-potentials.

The boundary conditions for the equations of motion of phase transitions of matter are the energy potentials, respectively, BM - $\varphi_{bm}=c^2$, DM - $\varphi_{dm}=4\pi/3c^2$. The energy potential difference is $\Delta\varphi=c^2$ determines the speed of light c.

Mach's principle and motion by inertia is determined by the inert properties of bodies arising in the process of CDMC, and the source of inertia and motion is the *tension-acceleration* **a** of the MEF Cosmos:

$$a=\frac{\Delta\varphi}{R}=\frac{(\varphi_1-\varphi_2)}{R} \quad (10)$$

and the force of inertia is $F_i=ma_i=m\Delta\varphi/R=m(\varphi_1-\varphi_2)/R$, where R–distance. $\quad (11)$

The cause for the existence of material bodies, which «*is also the cause for their movement*», is the constant convergence of DM in the form of BM in proportion to the mass, which is energetically expressed by:

$$E_t = \frac{mh}{t_P} = m\tau \ , \tag{12}$$

$$\text{where} \ \ \tau = \rho_e T = \frac{4H^2c^2T}{G} = \frac{4Hc^2}{G} = \frac{4c^2}{TG} \tag{13}$$

Energy for «existence», i.e. convergence-divergence of a material body for time t_p is proportional to the mass of this body and for 1 s is equal to:

$$E_t = m\mu, \tag{14}$$

where $\mu = 16\pi Hc^2 t_p/h = 16\pi Hc^2/N.$

This energy on an equipotential spherical surface of radius R will create an energy tension $a_\tau = E_t/4\pi R^2 = m\mu/4\pi R^2,$ on the other hand, according to modern physics, it is believed that a material body creates a gravitational field around itself with an acceleration-tension equal to $a_G = Gm/R^2.$ These two fields, describing the same process, are equivalent, and the tensions created by them are equal: $a_\tau = a_G,$ $m\mu/4\pi R^2 = Gm/R^2.$

Einstein: «*The tensor of the gravitational field $\upsilon_{\mu v}$ is a source of the field along with the tensor of material systems $\Theta_{\mu v.}$ The exceptional position of the energy of the gravitational field in comparison with all other types of energy would lead to unacceptable consequences*» [4]

Postulating, in the development of Einstein, the principle of equivalence of gravitational, inertial and MEF, we come to the conclusion about the same physical nature of motion in these fields, further - about *the identity of any motion of matter.*

The movement of the Cosmos as an "engine" occurs at a fundamental level in the process of CDMC as a "transformation" of BM into DM, changing the energy potential difference of the Cosmos. Knowledge of this process creates the possibility of building a fundamentally new non-mechanical engine and a new source of energy.

Gravitational waves are a wave-like change in the MEF Cosmos energy characteristics.

To describe the motion of MEF, we develop a system of equations similar to Maxwell's equations [2], where instead of an electromagnetic current there is a material-energy current as a result of energy-mass induction, and instead of electric charges, there are material bodies, and similarly to Einstein's equations of gravity [3], where instead of a metric tensor there is an energy tensor, and instead of the cosmological constant Λ — Hubble parameter H_0 . Coordinates-characteristics of MEF — ($x,$ $y,$ $z,$ $t_x,$ $t_y,$ $t_z,$ $\Delta\varphi,$ a).

Material-energy field (MEF) - is an absolute entity, formalized through the tensor MEF, the components of which are three components of the intensity of the material field and three components of the intensity of the energy field (energy induction), as well as the four-dimensional material and energy potential:

$$1.\ \mathrm{div}\mathbf{M}=\rho \tag{15}$$

$$2.\ \mathrm{rot}\mathbf{M}=0,\ \mathrm{rot}\mathbf{D}=0 \tag{16}$$

$$3.\ \iint\limits_{S} M\,dS = \iiint\limits_{V} \mathrm{div}M\,dV = \iiint\limits_{V} \rho dV = m \tag{17}$$

where $\mathbf{M}=\mathrm{grad}\varphi$ - tension MEF, $\mathbf{D}$ –dark matter induction, ρ – energy density MEF, m – mass.

(in the SI dimension system

$$\iint\limits_{S} M\,dS = \iiint\limits_{V} \mathrm{div}M\,dV = \iiint\limits_{V} 4\pi G\rho dV = \iiint\limits_{V} 4\pi Gm$$

where G – gravitational constant)
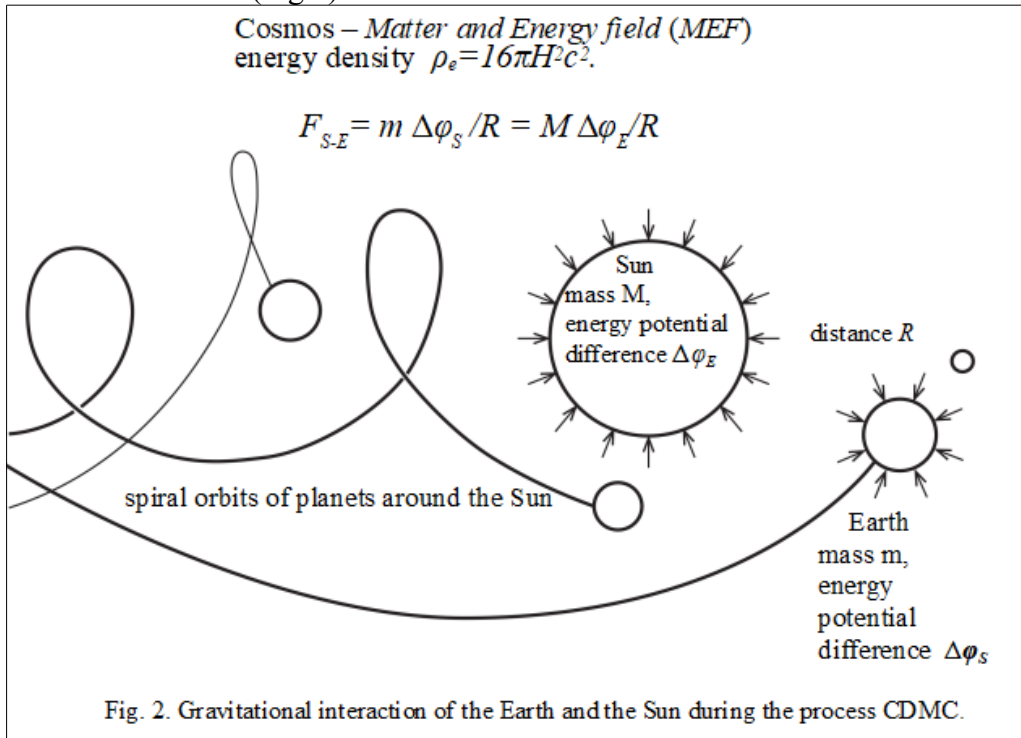
$$4.\ \tau=\sum_{V}\rho_e T = 16\pi Hc^2 \qquad \text{- power MEF} \tag{18}$$

(in the SI energy MEF in volume $1m^3$ в 1s, that is power MEF is equal to $\tau = 4\,Hc^2/G = h/t_P$)

For the motion and gravity of two spherical bodies, the solutions of these equations are simplified and using (9-18) the «driving force» F acting between the bodies is equal to

$$F=ma=m\frac{\varphi_2-\varphi_1}{R}=\frac{m\Delta\varphi}{R}=\frac{mGM}{R^2}=\frac{mMh}{4\pi R^2 t_P}=\frac{mM\tau}{4\pi R^2}=\frac{mE_t}{4\pi R^2}=\frac{mMp_e t_0}{4\pi R^2}=\frac{mMp_e}{4\pi R^2 H_0} \tag{19}$$

For the Earth and the Sun (Fig.2):

Fig. 2. Gravitational interaction of the Earth and the Sun during the process CDMC.

Solutions for the hydrogen atom [5], Sun and Earth [6,7], Supernova SN1987a [8], CMB [6,7], gravitational waves and neutrinos [6,7,9], Mach's principle [10], connection of fundamental constants [11,12], falsifiability and experiments [7,11,12].

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