

# Microcosm, Universe, Life



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The authors of this article have prepared the 3<sup>rd</sup> edition of the book "Microcosm, Universe, Life" and now they are looking for a publisher to edit Russian and English version. In particular, the mechanism of energy transformation in the Universe (Fig.1) is described in the book. Matter radiates energy in the form of photons (as well as neutrinos). In general this energy is observed in the form of Cosmic Microwave Background Radiation (CMBR). Photons and neutrinos transfer the most of energy to de Broglie longitudinal photons. Matter absorbs energy mainly in the form of longitudinal photons. Thus, a cycling process of energy

transformation (as well as matter transformation) occurs in the Stable Universe.

The 3<sup>rd</sup> edition is devoted to the description of 6 World Systems (Table 1), at that the 6<sup>th</sup> System is based on Unified Field Theory, which is developed by the authors, and proceeds from the following:

*(Editor's: The understanding of the energy transformation mechanism allows to develop new fuel-less energy sources based of mutual transformations: longitudinal photons  $\leftrightarrow$  transverse photons).*

**Table 1**

System	Principal Ideas
The 1 <sup>st</sup> – Geocentric (Ptolemaic system)	Geocentrism and Anthropocentrism
The 2 <sup>nd</sup> – Classic (Copernicus – Newton's system)	Description of the Universe on basis of Newton's Law of Gravity
The 3 <sup>rd</sup> – Compromise (Tycho Brahe's system)	The compromises between two first systems
The 4 <sup>th</sup> – Fractal (Charlie's system)	Non-heterogeneity of Large-Scale distribution of matter in the Universe
The 5 <sup>th</sup> – Relativistic (Einsteinian system)	Description of the Universe on basis of gravitational field equations. Anthropol principle
The 6 <sup>th</sup> – based on Unified Field Theory	Electromagnetic nature of all physical interactions. Irreversibility of all elementary micro-processes in combination with circular character of transformations in Large Scale of space ( $c/H=R$ order) and time ( $t_H=I/H$ order).

1. For theoretical results, which agree with the facts, it is necessary to use assigned inertial system (as Lorentz did), which, as we have known, is connected with CMBR. Obtained by this way decisions can be applied to the other systems, in particular, with use of Lorentz transformation for mass, energy, momentum, time and length.

2. Theory must agree with the whole known collection of facts, starting with such established

empirical generalizations as basic principles of Natural science (Giordano Bruno, Lyell) and conservation laws (Mayer, Joule, Helmholtz, Faraday, Newton, Huygens, Vernadsky).

3. All physical objects could be presented as the systems, consisting of quanta of positive electric charge (protons), quanta of negative electric charge (electrons in fermions or boson states, which are part of neutrons

and atomic nuclei) and quanta of energy, impulse, moment of momentum (apeirons).

4. The leading role in the Universe energetic belongs to de Broglie longitudinal photons (of the first class, i.e. with the spin  $I=0$ ), energy of which is twice as much as apeiron energy and is equal to  $hH$ , where  $h$  – is Plank's constant,  $H$  – is Hubble's constant.

5. Longitudinal photons, polarizable and depolarizable by matter particles, are the carriers of gravitational, magnetostatic and strong interaction. Electromagnetic interaction is carried by photons with spin  $I=\pm 1$  and weak interaction is carried by neutrinos and apeirons with spin  $I=\pm 0.5$ .

6. All elementary microprocesses are irreversible, that correlates with circular character of transformations in Large Scale of space and time.

7. In particular, there is an irreversibility of the process of photons and neutrinos motion. At each segment, equal to the length of de Broglie wave, photons and neutrinos lose energy  $hH$ , which is equal to longitudinal photon energy. In such a way, Hubble's law can be presented as the following:

$$\lambda = \lambda_1 \exp\left(\frac{r}{R}\right) = \lambda_1 \exp(Ht),$$

$$Z = \frac{\lambda}{\lambda_1} - 1 = \exp\left(\frac{r}{R}\right) - 1 = \exp(Ht) - 1,$$

where  $\lambda, \lambda_1$  – are observable and laboratory wave lengths,  $r$  – is distance,  $R$  – is radius of gravitation interaction, which is equal to the radius of Metagalaxy,  $t$  – is time,  $Z$  – is cosmological red shift.

8. As resulted upon this process, the excess of longitudinal photons is absorbed by matter. At that, mass is considered as measure of capacity, which is absorbed by matter in form of longitudinal photons. Thus, energy of the matter should be increased according to the law:

$$E(t) = m_0 c^2 \exp\left(\frac{\varepsilon' t}{c^2}\right) \approx m_0 c^2 + m_0 \varepsilon' t,$$

at that,

$$\frac{\varepsilon'}{c^2} = \frac{H}{137^2},$$

where  $\varepsilon'$  – is the capacity, which is absorbed by unit mass in form of longitudinal photons,  $c$  – is velocity of light. In particular, electron of the 1<sup>st</sup> Bohr orbit in hydrogen atom (i.e. in this case at de Broglie wave length) absorbs energy  $hH$  at 1 period.

9. Being in ionization state, intergalactic matter is the general portion of average density of matter in the Universe  $\rho_{av}$ , besides, the average value of absolute velocity of baryon component is close to  $c/137$ . Let's consider this correlation to be exactly executed.

CMBR is the most powerful cosmic radiation. Its specter is close to that one of black body at temperature

$T_F=2.726K$ , i.e. its spectral density is maximal at frequency  $\nu=160GHz$ . Cosmological red shift causes the increase of spectral density in radio-region ( $\nu<160GHz$ ) and the decrease of it in microwave region ( $\nu>160GHz$ ). Each of these processes is compensated by the inverse Compton effect, i.e. by the dispersion of radio-photons at matter corpuscle, first of all at protons. Calculations demonstrate, that average energy of absorbent radio-photons is equal to  $0.45 \cdot 10^{-15} \text{erg}$  ( $\nu=68GHz$ ) and average energy of radiated microwave photons is equal to  $2.17 \cdot 10^{-15} \text{erg}$  ( $\nu=330GHz$ ). There is one re-radiated microwave photon per one absorbed radio-photon. At that, the concentration of photons and CMBR spectrum remain unchangeable. Syunyaev and Zeldovich concerned the close inverse Compton-effect of CMBR dispersion on electrons in clusters of galaxies. Actually such an effect was discovered in 2 clusters of galaxies.

Thus, on transferring of energy to photons, matter corpuscles must fill the deficiency of energy by receiving it from longitudinal photons. In fact, there are observed demonstrations of longitudinal photons, they are "static fields". In this case it is a cosmic magnetic field, which accelerates charged particles of matter (Alfven). More detailed consideration let us to find a virial correlation between 4 main components of energy density:

$$\frac{\rho_{av} c^2}{137^2} = E_F = 2E_M = 2E_{kin},$$

where  $\rho_{av} c^2$  – is an energy equivalent of mass density of matter;  $E_F$  – is energy density of CMBR;  $E_M$  – is average energy density of magnetic field;  $E_{kin}$  – is average density of kinetic energy. Thus, some kinds of energy circularly transfer to another, which are interrelated (Fig. 1).

$$\frac{\varepsilon_{av} \rho_{av} V}{1.26} = E_F HV = 2E_M HV = 2E_{kin} HV =$$

$$= \frac{(\varepsilon_{av} - \varepsilon') \rho_{av} V}{0.26} = \varepsilon' \rho_{av} V,$$

where  $\varepsilon_{av}$  – is average capacity, radiated by unit mass in form of photons;  $V$  – is volume of  $10^{81} \text{cm}^3$  order, according to which the averaging is made.

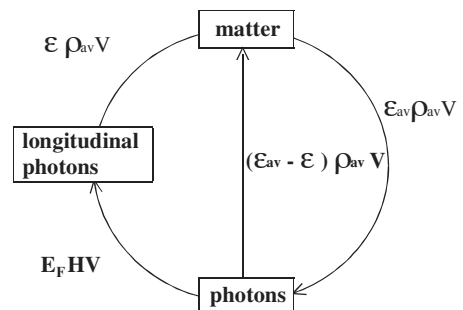


Fig.1

Energy transformation in Large Scale  $\varepsilon_{av}=0.0942 \text{erg gr}^{-1}\text{sec}^{-1}$  – is average energy, which matter unit radiates in unit time;  $\varepsilon'=0.07476 \text{erg gr}^{-1}\text{sec}^{-1}$  – is energy, which matter unit absorbs in form of de Broglie longitudinal photons in unit time;  $\rho_{av}=0.8730 \cdot 10^{-29} \text{gr cm}^{-3}$  – is average matter density in the Universe;  $E_F=4.18 \cdot 10^{-13} \text{erg cm}^{-3}$  – is energy density of cosmic microwave background radiation (CMBR);  $V \approx 10^{81} \text{cm}^3$  – is volume at which the averaging is made;  $H=1.562 \cdot 10^{-18} \text{Hertz}$ .

10. These correlations include pressures, densities and temperature  $T_F$ , i.e. we have the equation of the state of intergalactic matter, and thus of Metagalaxy and the Universe. Let us present this equation in simple form:

$$E_F = \frac{\varepsilon' \rho_{av} R}{c} \approx \frac{\varepsilon_{av} \rho_{av} R}{c}$$

and let us compare it with correlation for density of radiant energy on surface of a star \* or of star system

$$E_* = \frac{\varepsilon_* \rho_* R_*}{3c} \approx \frac{\varepsilon_* \rho_* R_*}{c}.$$

It is an especially amazing analogy between Metagalaxy (and the Universe) and large-scale cosmic system  $g$ , for which

$$E_g \approx \frac{\varepsilon_g \rho_g R_g}{c},$$

at that  $E_g \approx E_F$ ,  $\varepsilon_g \approx \varepsilon_{av} \approx \varepsilon'$ .

This equation agrees with the whole observed data of globular clusters, galaxies, groups and clusters of galaxies, in particular, with empirical correlations, which are magnitude - angular diameter.

11. The stated approach lets to determine the values of many fundamental constants by different ways. As a case in point, the results of definite values  $\varepsilon_{av}$  and  $\varepsilon'$ , erg  $g^{-1} c^{-1}$  are presented in the Table 2.

Table 2

#	Data	$\varepsilon_{av}$	$\varepsilon'$
1.	The boarder between two parts of the Main Sequence of stars	of 0.1 order	of 0.1 order
2.	The results of recalculation of observed star characteristics as respects to their centers	of 0.1 order	of 0.1 order
3.	The local minimum of star luminosity function near the Sun (according to G.A. Starikova's data)	of 0.1 order	of 0.1 order
4.	The correlation: mass - luminosity of white dwarf stars	of 0.1 order	of 0.1 order
5.	The correlation: mass - luminosity of neutron stars	of 0.1 order	of 0.1 order
6.	The correlation: mass - luminosity of globular clusters	less than 0.5	less than 0.5
7.	The correlation: mass - luminosity of elliptic galaxies	more than 0.06	more than 0.06
8.	The correlation: mass - luminosity of spiral galaxies and irregular galaxies <i>Ir I</i>	less than 0.5	less than 0.5
9.	The correlation: mass - luminosity of galaxies as a whole	of 0.1 order	of 0.1 order
10.	The correlation: mass - luminosity of clusters of galaxies	of 0.1 order	of 0.1 order
11.	Empiric values of $H$ , $\rho_{av}$ , $E_F$ constants	of 0.1 order	of 0.1 order
12.	The most exact values of $h$ , $e$ , $G$ , $E_F$ constants	0.0942	0.07476

12. Uncontradictory description of Microcosm and the Universe promotes the better understanding of Life, which is inseparably unified with them. The statistical data manipulation of more than 100 catalogues of microphysics and cosmic objects let us to get more than 1000 empirical correlations and diagrams, and to determine, that they agree with theoretical correlations, which were received according to the ideas on circular character of energy transformations (Fig. 1) and of matter in the Universe.

The Russian edition of the book is mailed out: the 1<sup>st</sup> edition (1995) at the cost of \$3; the 2<sup>nd</sup> edition (1998) at the cost of \$6.

**The authors are thankful for valuable discussions to Yaroslav G. Klyushin and to Alexander V. Frolov.**