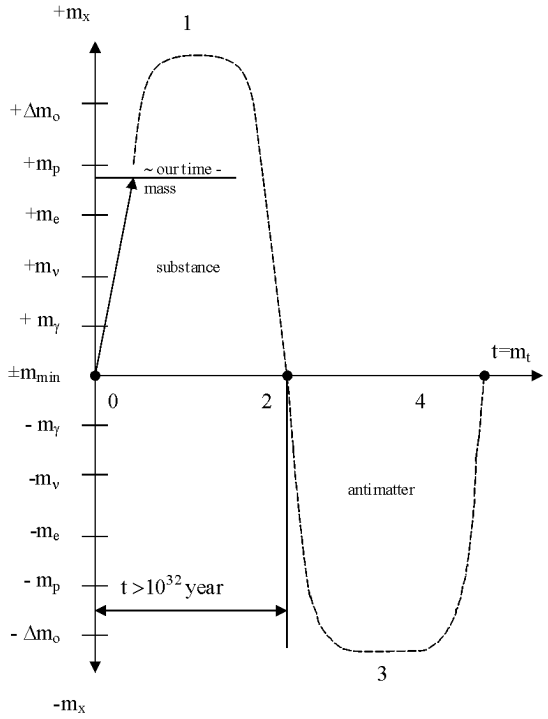
U K R A I N E ISSN 1726-4499

Spacetime & Substance

International Physical Journal



Volume 4, No. 3 (18), 2003

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U K R A I N E ISSN 1726-4499

Spacetime & Substance

International Physical Journal

Certificate of the series AB, No. 4858, issued by the State Committee for Information Policy, TV and Broadcasting of Ukraine (February 12, 2001).

The Journal is published by Research and Technological Institute of Transcription, Translation and Replication, JSC(Kharkiv, Ukraine).

It is a discussion journal on problems of theoretical and experimental physics in the field of research of space, time, substance and interactions. The Journal publishes:
— the theories combining space, time, gravitation and others interactions (including the Einstein's SR and GR);
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The volume of one issue is 48 pages. Format is A4. Periodicity: 5 issues per one year during 2000–2002; monthly since 2003. The language is English. The equivalent versions: paper and electronic (*.TEX, *.PS, *.PDF).

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Spacetime & Substance, Vol. 4 (2003), No. 3 (18), pp. 97–102
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COSMOLOGICAL CONSEQUENCES OF THE YUKAWA POTENTIAL INVOLVEMENT IN GRAVITATIONAL AND ELECTROMAGNETIC FIELDS INTERACTION EVALUATED BY ENU MODEL

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Received April 2, 2003

Model of Expansive Nondecelerative Universe (ENU) due to involving Vaidya metric makes it possible to localize the energy density of gravitational field. This its capability allows for answering several open questions and supporting (or contradicting) results obtained using different theoretical approaches. This paper is aimed to contributing to a solution of some cosmological problems, in particular those linked to the Yukawa potential consequences, independent way of dark matter estimation, ionospheric F2 layer behaviour, and cyclotron radiation.

1. Introduction

Starting from the beginning of 80's, the inflation model of the universe acquired dominant position in cosmology. The model has been able to eliminate certain cosmological problems, at the same time it has, however, open new questions, such as the Universe age, Hubble's constant or deceleration parameter values. It has not, however, contributed to deepen our understanding of the gravitation and its relation to the other physical interactions. Moreover, in accordance with some analyses [1], the initial nonhomogenities should not be eliminated but they are rather enhanced within the inflation period.

Open questions have been a challenge for developing further models of the Universe, one of them being Expansive Nondecelerative Universe model [2-4]. The ENU model manifest its capability both by offering answers to several open questions and supporting results obtained by other theoretical approaches. The present paper continues in this tendency and is aimed to contributing to a solution of some cosmological problems, in particular those linked to the Yukawa potential consequences, independent way of dark matter estimation, ionospheric F2 layer behaviour, and cyclotron radiation.

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2. Background of Expansive Nondecelerative Universe model

The cornerstones of ENU, rationalized in more detail in [2-4] are as follows:

1. The Universe, throughout the whole expansive evolutionary phase, expands by a constant rate equals the speed of light c obeying thus relation

$$r_U = c\,t_U = \frac{2\,G\,m_U}{c^2}, \tag{1}$$

   where r_U is the Universe radius, t_U is the cosmological time, m_U is the Universe mass (their present ENU-based values are $r_U \cong 1.299\,x\,10^{26}$ m, $m_U \cong 8.673\,x\,10^{52}$ kg, $t_U \cong 1.373\,x\,10^{10}$ yr, and match well with generally accepted values [5-7]).

2. The curvature index and Einstein cosmologic constant are of zero value.

3. The mean energy density of the Universe is identical just to its critical density (its present value given by the ENU is 9.536×10^{-27} kg/m^3, that provided in [6] is 9.47×10^{-27} kg/m^3).

4. Since a is increasing in time, m_U must increase as well, *i.e.* in the ENU, the creation of matter occurs. The total mass-energy of the Universe must, however, be exactly zero. It is achieved by

a simultaneous gravitational field creation, the energy of which is negative. The fundamental mass-energy conservation law is thus observed.

5. Due to the matter creation, Schwarzschild metrics must be replaced in ENU by Vaidya metrics [8, 9] in which the line element is formulated as

$$ds^2 = \left(\frac{d\Psi}{c\,dt}\right)^2 \frac{1}{f^2_{(m)}} \left(1 - \frac{2\,\Psi}{r}\right) c^2\,dt^2 -$$

$$-\left(1 - \frac{2\,\Psi}{r}\right)^{-1} dr^2 -$$

$$-r^2\left(d\theta^2 + \sin^2\theta\,d\varphi^2\right) \tag{2}$$

and the scalar curvature R (which is, contrary to a more frequently used Schwarzschild metric, of non-zero value in Vaidya approach also outside a body allowing thus to localize the gravitational energy density) in the form

$$R = \frac{6\,G}{c^3\,r^2}.\frac{dm}{dt} = \frac{3\,r_g}{r_U\,r^2}, \tag{3}$$

where m is the mass of a body, G (6.67259×10^{-11} kg^{-1} m^3 s^{-2}) is the gravitational constant, r is the distance from the body, r_g is the gravitational radius of the body, $f_{(m)}$ is an arbitrary function, and Ψ is defined [3] as

$$\Psi = \frac{G\,m}{c^2}. \tag{4}$$

In order to $f_{(m)}$ be of nonzero value, it must hold

$$f_{(m)} = \Psi\left[\frac{d}{dr}\left(1 - \frac{2\,\Psi}{r}\right)\right] = \frac{2\,\Psi^2}{r^2}. \tag{5}$$

Based on (1), in the framework of the ENU model

$$\frac{d\Psi}{c\,dt} = \frac{\Psi}{r_U}. \tag{6}$$

Dynamic character of the ENU is described by Friedmann equations. Introducing dimensionless conform time, equation (1) can be expressed as

$$c\,dt = r_U\,d\eta \tag{7}$$

from which

$$r_U = \frac{dr_U}{d\eta} \tag{8}$$

Applying Vaidya metric and stemming from Robertson-Walker approach, Friedmann equations can be then written in the form [10]

$$\frac{d}{d\eta}\left(\frac{1}{r_U}.\frac{dr_U}{d\eta}\right) = -\frac{4\pi\,G}{3c^4} r_U^2\,(\varepsilon + 3p); \tag{9}$$

$$\left(\frac{1}{r_U}.\frac{dr_U}{d\eta}\right)^2 = \frac{8\pi\,G}{3c^4} r_U^2\,\varepsilon - k, \tag{10}$$

where ε is the critical energy density (the Universe actual density within the ENU model) and p is the pressure. Based on (9) and (10) it follows

$$\varepsilon = \frac{3\,c^4}{8\pi\,G r_U^2}; \tag{11}$$

$$p = -\frac{\varepsilon}{3}. \tag{12}$$

Equations (11) and (12) represent the matter creation and the negative value of gravitational energy, respectively (for more details, see [2 - 4]).

Applying Vaidya metric to one body (a system with the mass m), a distance dependence of the gravitational field density ε_g created by this body obeys relation (13) in the weak field condition

$$\varepsilon_g = -\frac{R\,c^4}{8\,\pi\,G} = -\frac{3\,m\,c^2}{4\,\pi\,r_U\,r^2}. \tag{13}$$

The absolute value of the gravitational field density of a system equals to the critical density at the distance r_{ef} (effective interaction range of its gravitational force). Comparison of the relations (4), (11) and (13) leads to

$$r_{ef} = (r_g\,r_U)^{1/2} = (2\,\Psi\,r_U)^{1/2} \tag{14}$$

in which r_g means the gravitational radius of a body with the mass m.

Vaidya metric may be applied in all cases for which the gravitational energy is localizable, i.e. in cases being governed by relation (15)

$$r < r_{ef}. \tag{15}$$

Gravitational influence can be thus actually realized only if the absolute value of the gravitational energy density created by a body exceeds the critical energy density, i.e. the mean gravitational energy density of the Universe. If

$$r \geq r_{ef} \tag{16}$$

Vaidya metric adopts the form of Schwarzschild metric preventing the energy of gravitational field from localization.

A typical feature of the ENU model lies in its simplicity, in fact that no "additional parameters" or strange "dark energy" are needed, and in the usage of only one state equation in describing the Universe.

3. Yukawa potential and our solar system

The potential bearing Yukawa name was introduced into physics in 1935 in connection with prediction of mesons [11]. Originally it was formulated in the form

$$E_{p(r)} = -\frac{E_o r_o}{r} \exp(-r/r_o), \tag{17}$$

where $E_{p(r)}$ is the nuclear potential energy between two nucleons at the distance r , r_o is the range of the nuclear forces, E_o is the strength of the interaction. A similar potential was, however, formulated some years earlier by Neumann and Seeliger when describing gravitational interactions.

Later on, the Yukawa potential demonstrated its importance in solving various issues of particle physics and penetrated into chemistry, mainly in rationalization of liquid-vapour equilibrium, monomer-dimer mixtures behaviour, etc. [12–14].

Reevaluating Einstein equations, Zhuck highlighted the importance of the Yukawa potential for the Universe understanding and manifested its importance for the gravity forces in his recent paper [15].

In this paper the Yukawa-type gravitational potential is discussed from the viewpoint of its applicability for a single body and, more generally, for any system with defined dimensions such as a galaxy, supercluster, etc.). Differences emerging from application of the Newtonian and Yukawa potentials are exemplified by our solar system, eliptic galaxies and super clusters parameters. The discussion is held in the framework of the Expansive Nondecelerative Universe model (ENU).

Taking Vaidya metric into account, the non-relativistic gravitational potential outside a body with the mass m can be expressed in the form

$$\Phi = \Phi_o \exp(-r/r_{ef}), \tag{18}$$

where

$$\Phi_o = -G \int \frac{\rho}{r} dV = -\frac{G\,m}{r}. \tag{19}$$

It follows both from the Zhuck [15] and our approaches that consequences of the potential, i.e. differences between results provided using the Newtonian and Yukawa potentials can actually be observed only taking sufficiently large distances r into account. We have chosen our solar system (its the most distant planets - Neptun and Pluto), and eliptic galaxies as examples. The results obtained enable us to estimate the amount of dark matter in the investigated galaxies and in the whole Universe.

The Sun mass is [16]

$$m_{(Sun)} = 1.9891 \times 10^{30} \text{ kg}, \tag{20}$$

which represents 99.866% of the mass of the whole solar system, m_{SS} , being

$$m_{(SS)} \cong 1.9918 \times 10^{30} \text{ kg}. \tag{21}$$

The effective interaction range of the solar system $r_{ef(SS)}$ based on (14) and (21) is as follows

$$r_{ef(SS)} \cong 6.43 \times 10^{14} \text{ m}. \tag{22}$$

A mean square of velocity of the planets revolution can be expressed, the Yukawa potential including, as

$$\bar{v}^2 = \frac{4\,\pi^2\,\bar{r}^2}{t^2} = \frac{G m_{(SS)}}{\bar{r}} \exp(-\bar{r}/r_{ef}) \tag{23}$$

of which

$$-r_{ef} \ln \frac{4\pi^2\,\bar{r}^3}{G\,m_{(SS)}\,t^2} = \bar{r}, \tag{24}$$

where t is the orbital period of a planet around the Sun, $\bar{r}$ is a mean Sun-to-planet distance. Relations (21), (22), (21), and known t for Neptun lead to the following ENU-based value

$$\bar{r}_{(Neptun)ENU} = 4.488 \times 10^{12} \text{ m}. \tag{25}$$

Calculation based on the Newtonian potential gives

$$\bar{r}_{(Neptun)NP} = 4.496 \times 10^{12} \text{ m}. \tag{26}$$

Difference of both the values is about 0.2%. A similar treatment for Pluto leads to

$$\bar{r}_{(Pluto)ENU} = 5.862 \times 10^{12} \text{ m} \tag{27}$$

and

$$\bar{r}_{(Pluto)NP} = 5.878 \times 10^{12} \text{ m}, \tag{28}$$

i.e. about 0.3% deviation.

4. The Universe dark matter estimation

Generally, the more massive gravitationally bonded structure, the lower its energy density. It can be supposed that for superclusters or giant clusters of galaxies, their energy density approaches the critical density. It means that dimension of such systems is

$$r \cong r_{ef}. \tag{29}$$

Consequently, the total mass of such systems dark, matter including, may be determined directly from their dimensions. Based on (14) and (22) it follows

$$m_{(Galaxy,total)} \cong \frac{r^2\,c^2}{2\,G\,r_U}. \tag{30}$$

The observable mass of the most massive, up-to-now known eliptic galaxies reaches

$$m_{(Galaxy,obs)} \approx 10^{13} m_{(Sun)} \tag{31}$$

and their dimensions are about

$$r \cong r_{ef} \cong 1.56 \times 10^{22} \text{ m}. \tag{32}$$

Stemming from (23) and (32) the total mass of such galaxies, dark matter including, represents

$$m_{(Galaxy,total)} \approx 10^{15} m_{(Sun)}. \tag{33}$$

An observable mass of an average-sized super cluster is

$$m_{(SC,obs)} \approx 10^{16} m_{(Sun)} \tag{34}$$

and its dimension is about

$$r_{(SC)} \cong r_{ef} \cong 7.1 \times 10^{23} \text{ m}. \tag{35}$$

Based on (23), the total mass of a super cluster reaches

$$m_{(SC,total)} \approx 10^{18} m_{(Sun)}, \tag{36}$$

which directly leads, comparing the values mentioned in (25) and (27), to a result that the total mass exceeds by about two orders the "visible" mass, i.e. the majority of the total matter is hidden in the form of dark matter.

Based on validity of (22), relations (20) and (23) provide the rotational velocity of super cluster (SC) and giant eliptic galaxies (EG)

$$v = c \left(\frac{r}{2 \times 2.71 \, r_U} \right)^{1/2}. \tag{37}$$

Provided that the dimensions (radius) of gravitationally bonded systems - super clusters and giant eliptic galaxies - are known, and including the gauge factor r_U value into account, values of their rotational velocity emerge

$$v_{(EG)} \cong 1.3 \times 10^6 \text{ m/s}; \tag{38}$$

$$v_{(SC)} \cong 8.9 \times 10^6 \text{ m/s}. \tag{39}$$

The above mentioned ENU-based calculated values are in good accordance with those experimentally observed.

5. Breaking electron-cation radiation of the F2 layer of ionosphere

The F2 layer is part of the Earth ionosphere formed predominantly by atomic ogyxen cations and electrons (the concentration and kind of neutral molecules, a degree of ionization and temperature depend on several factors, the most important being solar radiation intensity, season of the year, etc.) [17, 18]. Our attention will be focused on the electrons present in the F2 layer.

The effective cross section $d\sigma$ related to the emission of a photon (bremsstrahlung, i.e. breaking radiation) in the frequency interval $d(\hbar\omega)$ by an electron in the field of a cation with the charge $Z\,e$ is defined by Bethe-Heitler formula [19, 20]

$$d\sigma = \frac{8Z^2\alpha\, r_e^2}{3} . \frac{m_e c^2}{E_e} . \frac{d\omega}{\omega} \times$$

$$\times \ln \frac{\left[E_e^{1/2} + (E_e - \hbar\omega)^{1/2} \right]^2}{\hbar\omega}, \tag{40}$$

where α is the fine structure constant, m_e, r_e, E_e are the electron mass, radius, and kinetic energy, respectively.

The radiation output of a plasma volume unit is obtained by multiplying the photon energy $\hbar\omega$ with the current density of electrons n_e colliding with cations having the density n_i. In a limiting case of the total one-electron ionization (a state not far from the actual state approached at favourite atmospheric conditions), $Z = 1$, $n_e = n_i = n$, and

$$dI_{(\omega)} = n^2 \hbar\omega \, v \, d\sigma. \tag{41}$$

At integration of (40) the following substitution is applied

$$2\, E_e = \hbar\omega \, (1 + chx) \, . \tag{42}$$

Then, based on (40) to (42), the total radiation output of a plasma volume unit at the electron-cation collisions is given as

$$I_{(e_i)} = \frac{32}{3} . \left(\frac{2}{\pi} \right)^{1/2} \alpha \, c^3 r_e^2 m_e n^2 t^{1/2}, \tag{43}$$

where

$$t = \frac{k\,T}{m_e c^2}. \tag{44}$$

It is generally accepted that the F2 layer peaks at about 2×10^{12} e^-/m^3 during the day and $5 \times 10^{10} e^-/m^3$ during the night. The electron temperature is widely spread in the range of 1000 K to 3000 K. On the other hands, for the cations, the temperature covers 800 K to 1500 K. The pressure in this region ranges between $10^{-5} - 10^{-6}$ Pa and the ionic mean

free path is 4.5 to 15 km. Accordingly, the ionospheric plasma can be considered as a highly ionized, almost collisionless gas in the F2 region [18]. Based on the above values and relation (43), the total output of the breaking radiation in a volume unit of the F2 layer reaches (in the calculation, limiting conditions of the temperature interval from 1000 K to 3000 K, and electron concentration from 1×10^{12} e^-/m^3 to 2×10^{12} e^-/m^3 were taken)

$$I_{(e_i)} = 4.9 \times 10^{-15} - 3.3 \times 10^{-14} \text{ W/m}. \tag{45}$$

Gravitational output is in the ENU defined as

$$|P_g| = \frac{d}{dt} \int \frac{c^4}{8\,\pi\, G}\, R\, dV = \frac{m\, c^3}{r_U}. \tag{46}$$

Taking the concentration of oxygen cations in a volume unit of the F2 layer,

$$|P_g| = 5.0 \times 10^{-15} - 1.0 \times 10^{-14} \text{ W/m}. \tag{47}$$

Thus, during the daytime, the gravitational output approaches the breaking radiation output (intervals of the outputs overlaps, as shown by (45) and (47)).

6. Cyclotron radiation of the Sun surface

The mass density at the Sun surface is about

$$\rho \cong 1 \text{ kg/m}^3, \tag{48}$$

which corresponds to particle concentration

$$n \approx 10^{27} \text{ m}^{-3} \tag{49}$$

at the Sun surface temperature

$$T \cong 5.8 \times 10^3 \text{ K}. \tag{50}$$

At these conditions (further, for calculation purposes, the value expressed in (48) is taken as an exact value), the ionization degree is

$$\chi = 1.161 \times 10^{-6}, \tag{51}$$

which leads to the concentration of free electrons

$$n_{(e)} = 1.161 \times 10^{21} \text{m}^{-3}. \tag{52}$$

At such conditions the Debye-Hückel radius is still higher than the mean ion-ion distance, i.e. the kinetic energy of the present particles exceeds electromagnetic Coulomb energy of the ions.

Owing to the relatively great mass of the present cations, their cyclotron radiation may be omitted. Breaking electron-cation and electron-electron radiation (bremsstrahlung [19]) is due to a high cation concentration extremely high.

A particle with the charge e and acceleration a emits in a second the energy

$$E_c = a^2 . \frac{e^2}{6\,\pi\, \varepsilon_o\, c^3}. \tag{53}$$

Following substitutions

$$a = \frac{e\ v_e\, B}{m_e} \tag{54}$$

and

$$r_e = \frac{e^2}{4\,\pi\ \varepsilon_o m_e c^2} \tag{55}$$

equation (53) may be expressed as

$$E_c = \frac{8\,\pi\, r_e^2 c\, \varepsilon_o v_e^2 B^2}{3}, \tag{56}$$

where

$$v_e^2 = \frac{2\,kT}{m_e}. \tag{57}$$

The total cyclotron radiation in a volume unit of the plasma forming the Sun surface is

$$I_c = n_e E_c = \frac{16\,\pi\, r_e^2 c\, \varepsilon_o kT\, n_e B^2}{3\, m_e}. \tag{58}$$

The gravitational output of this volume unit is

$$P_g = \frac{\rho_{pl}\ c^3}{r_U} \cong 0.2 \text{ W/m}^3 \tag{59}$$

provided that the plasma density is

$$\rho_{pl} \cong 1 \text{ kg/m}^3. \tag{60}$$

The identity of (58) and (59) gives the value of induction

$$B \cong 7.6 \times 10^{-2} \text{ T}. \tag{61}$$

This is a real value since the maximal value at Sun spots approaches

$$B_{\max} \cong 10^{-1} \text{ T}. \tag{62}$$

The magnetic field energy density is defined as

$$W_B = \frac{B^2}{2\,\mu_o}. \tag{63}$$

Then, a comparison of (13) and (63) leads to the critical Sun induction value

$$B_{crit} \cong 3.8 \times 10^{-2} \text{ T}. \tag{64}$$

The above results, namely very closed values of (61) and (64) allow us to formulate a conclusion stating that the cyclotron and gravitational output of a volume unit of the plasma forming the Sun surface are (almost) identical which may have an effect on the Sun corona heating.

7. Cyclotron radiation at the end of radiation era

At the end of radiation era, the concentration of ions was very low and, consequently, the effect of breaking electron-ion and electron-electron radiation may be omitted. This part will be devoted and limited to cyclotron radiation only. Stemming from the identity of (56) and (13), introduction of the expressions (65) – (68)

$$r_e = \frac{\alpha\,\hbar}{m_e c}; \tag{65}$$

$$v_e^2 = \frac{2\,kT}{m_e}; \tag{66}$$

$$kT = E_{Pc}.\left(\frac{l_{Pc}}{r_U}\right)^{1/2}; \tag{67}$$

$$B^2 = \frac{3\,c^2}{8\,\pi\,G\,r_U^2\,\varepsilon_o} \tag{68}$$

and application of the gravitational output of an electron

$$|P_e| = \frac{d}{dt}\int \frac{c^4}{8\,\pi\,G}.R\,dV = \frac{m_e c^3}{r_U} \tag{69}$$

lead to

$$r_{U(re)} = \left[\frac{2\,\alpha^2 E_{Pc}\,\hbar^2\,(l_{Pc})^{1/2}}{m_e^4 G\,c^2}\right]^{2/3} \approx 10^{22}\ \mathrm{m}, \tag{70}$$

where $E_{Pc}(1.2211\times10^{19}$ eV) and $l_{Pc}(1.616051\times10^{-35}$ m) are the Planck energy and length, respectively. Relation (70) shows that at the end of radiation era, the electron emitted identical amounts of the cyclotron radiation and gravitational energy. It should be pointed out that the gravitational influence of the electron was not observable at that time.

The Compton wavelength of a proton is

$$\lambda_p = \frac{\hbar}{m_p c}, \tag{71}$$

where m_p is the proton mass. When comparing (14) and (71), the time of the proton gravitational influence on its surrounding is obtained. It is the time in which the Universe radius reached the value

$$r_{U(re)} = \frac{\hbar^2}{2\,G\,m_p^3} \approx 10^{22}\ \mathrm{m}, \tag{72}$$

i.e. just at the end of radiation era. Putting relations (70) and (72) identical, a formula relating the proton and electron masses is obtained in the form

$$\frac{m_p}{m_e} = \left(\frac{m_{Pc}}{32\,m_p}\right)^{1/8} \alpha^{-1/2} = 1860. \tag{73}$$

The value in (73) is in excellent agreement with the experimental value.

Acknowledgement

This work was supported by the Grant Agency VEGA through grant No. 1/9251/2.

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Spacetime & Substance, Vol. 4 (2003), No. 3 (18), pp. 103–113
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PHOTONUCLEAR AND BETANUCLEAR SYNTHESIS IN AN ALIVE NATURE

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August 9, 2002

Cells of vegetative origin execute photosynthesis. The author offers his own explanation methodology of the photosynthesis phenomenon. He has shown that cells of animal origin also perform the process of a biomass synthesis. As there is no title for this synthesis, the author has given it a title — betasynthesis. And he has developed the theory of betasynthesis.

1. Introduction

Despite of a huge cell variety, they are strictly divided into two classes only:

1. Cells of vegetative origin (CVO).
2. Cells of animal origin (CAO).

CVO and CAO differ from each other a little as for appearance. All of them have a shell, a nucleus and cytoplasm, nevertheless, they have key difference from each other.

Really, CVO executes photosynthesis in its habitability, and science has not given the clear answered yet until nowadays what CAO executes.

The author of the work has proved that CAO also performs the process of a biomass synthesis, as well as CVO, only this synthesis differs essentially and principally from photosynthesis CVO.

As there is no title for this synthesis, the author has given it a title - betasynthesis (the Greek letter is meant as the word "beta," indicating electron current in nuclear physics).

2. Photosynthesis

One of the key differences CVO and CAO is those that the cytoplasm of the first consists, primarily, of chlorophyll, and the cytoplasm of the second consists of hemoglobin.

Chlorophyll has a different chromatics, but it is green in the majority of ground-level plants. Hemoglobin CAO has red color more often, though hemoglobin and blood of sprouts (marine mollusk) and some animals, naturally, has blue color.

The chemists' investigations demonstrate that chlorophyll and hemoglobin have similar chemical structures. The difference consists only in those that photoemissive elements of Mendeleyev's table are in a chlorophyll porphyry nucleus, such as: magnesium, zinc, silver, quicksilver, germanium, selenium, fluorine, cesium, strontium. Though there are not photoemissive, but thermoemissive elements of D.I. Mendeleyev's table, namely: iron, nickel, cobalt, copper, gold etc. in hemoglobin porphyry nuclei.

Thus, chlorophyll CVO differs from hemoglobin CAO only by those that there is magnesium in chlorophyll porphyry nuclei, and divalent iron is in the same hemoglobin nuclei. Therefore chlorophyll is green, and hemoglobin is red.

The chlorophyll chromatics is stipulated by magnesium photoelectron effect, which can be released of their free electrons from photon action, green-red spectral colors of light.

Hemoglobin has red color only because there will be red light radiating from hemoglobin at an electron bombardment of iron atoms.

The close likeness of chlorophyll and hemoglobin makes them interchangeable, as both magnesium and iron are divalent. Therefore hemoglobin can be obtained easily from plant chlorophyll, and on the contrary, hemoglobin can be turned into chlorophyll easily.

The author proposes to use this important fact at production of artificial blood from plants juices in hematology, that allows to avoid of donor blood almost completely, though nevertheless it is easier to obtain it from animal blood.

It is necessary to recollect photosynthesis properties in matters for the photosynthesis phenomena understanding, the essence of which is exhibited in the following.

If a light bundle can be directed to a metallic surface, so light photons will pull out electrons from metal. The atom, lost an electron, will have positive charge according to Coulomb's law, which was compensated with the lost electron before it.

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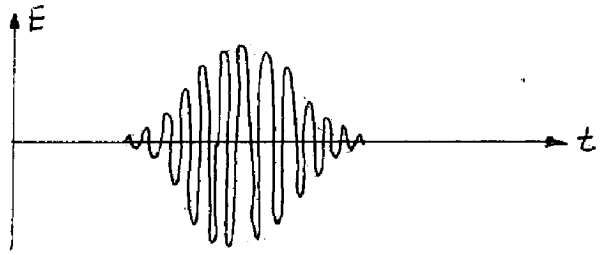

Figure 1: Temporal function of a photon

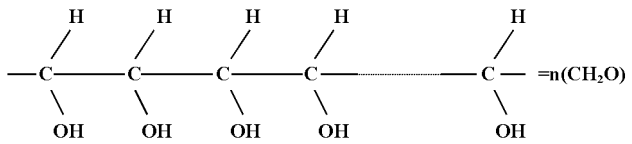

Figure 2: The structural diagram of connective tissues

This experimental fact makes sure, that light photon can be in interaction with matter electrons, if the energy of electron output is commensurable with photon energy.

Understanding that a photon represents not the other one, but wave delta function (Fig. 1), it can be proved that the photon and electron interaction is possible only in case, if electron will be determined by mass. The more electrons mass, the lower frequency it will react with photon.

Iron contains larger electrons with the mass approaching to meson mass sometimes. Therefore, to pull out iron hard electrons from atom, it is necessary to have high-power photons of low frequency. Principally photoelectronic effect in iron can be realized only by infrared rays.

Photons of higher frequencies of an optical wave range will be operating photons for atoms, containing electrons of smaller mass.

The photon and electron interrelation always exists. However, this interrelation has the extremely nonstable nature in the photoeffect phenomena. Really, an electron can leave atom from a strong photon finally, and can remain in it as well. If an atom is bombarded with electrons, so any electron retardation will go to photon radiating. As the electron is a particle, and the photon is an electromagnetic wave, so photon-electron transformation will be asymmetrical according to the irreversibility principle. In other words, any electron slowing-down will go to photon radiating, but not any photon will be capable to pull out an electron from atom. It is explained also, that the photoelectronic emission cannot be observed in all matters of D.I. Mendeleyev's table.

Nature, primarily, has chosen magnesium, which became the basis of the whole Earth's flora from that small list of elements having photoeffect.

Precisely there are few elements in D.I. Mendeleyev's table for a betasynthesis realization. Therefore iron in hemoglobin is not casual absolutely, as it can be only divalent, as it appeared not casual.

Iron and magnesium altogether allowed to create vegetative and animal biomass on the ground with photo-and-betasynthesis.

The surprising photosynthesis feature is the reproduction of vegetative biomass actually in three-four substances of D.I. Mendeleyev's table. In particular, all connective tissues consist, primarily, of carbon and water:

Here magnesium becomes not an element of chemical reaction, but only the catalyzer after electron loss at photosynthesis. It becomes the catalyzer not of a chemical reaction, but a catalyzer of carbon dissolution in water with consequent crystal formation like Fig. 2. Here connective tissues are formed at the expense of carbon dioxide and water interaction. Naturally, the exuberant oxygen is released from the reactions:

$$nH_2O + nCO_2 = n\,(CH_2O) + nO_2, \qquad (1)$$

as the water H_2O at the presence of magnesium catalyzer has more strong oxidizing properties for carbon, than oxygen. Therefore oxygen will be released at photosynthesis, and carbon C will be diluted as though in the proportion (1:1), forming combinations like Fig. 2 and the formulas CH_2O.

It is curious to notice, that the combination like CH_2O is as though in the inversely inhibited system, i.e. in the regime of energy accumulation. It means, that high-performance fuel is formed at carbon dissolution in water with crystal formation like Fig. 2.

The matter like Fig. 2 is not neutral, as the chain beginning and end CH_2O are capable to connect one more molecule to itself, or to become isolated into a ring, or to go for the formation of porphyry nucleus, chlorophyll, alkaloids, sugars, proteins, fats.

There is the similar process at betasynthesis. However, the biomass will be sourer because of strong oxidizing processes.

3. Betasynthesis

To understand betasynthesis, let's recollect the thermoelectronic emission effect from the physics course. The effect essence is in those, that they do not radiate photons only, but emit electrons at matters heating up as well.

The remarkable property of a thermoelectronic emission is that the matter, losing electrons, does not acquire charge ability, as the Coulomb's law requires it.

The electron emission is made without fields' involvement. If the heated bodies were charged at a thermoelectronic emission, so such luminaries, as the Sun, would accumulate positive charges of astronomical magnitude. Actually we can't observe anything similar.

The thermoelectronic emission phenomena have been used by the man since old times. So, the first electronic lamps were based on the electron emission use for increasing of weak electric fields and currents.

The modern electron-beam tubes in TV sets use the thermoelectronic emission for an electron beam formation as well. The electronic guns in electronic-welding apparatuses are produced in the similar way also. In all cases the heated body property is used to emit free electrons without charge formation.

However the electron emission property of a heated body is not eternal. Therefore such instant occurs very soon, when the emissive matter capacity weakens quickly and the matter does not wish to beam electrons any more at heating up.

The thermoelectronic emission effect is not explained in a modern physics. Really, if to rely upon the modern theories of atomic physics, so it is impossible to explain a thermoelectronic emission owing to the absence of positive charges originating.

As the experimental fact of a thermoelectronic emission goes counter with known explanations, we shall give our explanation of this phenomenon.

If to pay attention to a helium atom (its atomic weight is equal to 4.0026, and it has only two electrons according to old imaginations, so it is formed from two hydrogen atoms (deuterium D).

The coupling property proves that all matters can not be in an atomic view for a long time. Therefore hydrogen is as a molecule D_2^2 in this case, in which there are two neutrons, two protons and two electrons in a nucleus.

If a hydrogen molecule (protium) to heat under larger pressure at high temperature, so it will be possible to observe a thermoelectronic emission, at which the hydrogen molecule will lose electrons. Thus the molecule charging can remain constant only in case if one of the molecule neutrons will turn into a meson, i.e. into a particle with atomic weight equal to a neutron, but with a charge equal to an electron. In other words, the hydrogen molecule turns into a deuterium atom under the above mentioned requirements according to the schema:

$$H_2^2 \rightarrow D^1 \rightarrow e^- \ \ (electrons)\,. \tag{2}$$

The deuterium atoms are coupled into a deuterium molecule D2 according to a coupling property, at which there will be four nucleons and two electrons.

If a deuterium molecule can be heated under the pressure at high temperature, so the deuterium molecule will turn into helium atom:

$$D_2^2 \rightarrow He^2 \rightarrow h\nu \ \ (photons)\,. \tag{3}$$

Thus, the light hydrogen will turn into helium with the release of electrons and radiation energy.

Understanding the process of thermonuclear synthesis, in which the molecular hydrogen is converted to helium with electrons release, it is possible to detect, that any thermoelectronic emission in matters has a direct relation to thermonuclear synthesis.

Therefore emissive properties of matters are characterized by incompleteness of hydrogen thermonuclear synthesis into helium, which is always available as impurities in all matters.

The thermonuclear synthesis is principally possible at hard atoms transforming as well, so, if a quicksilver atom can be heated under high pressure, so one electron will be torn apart from it, and the quicksilver will turn into gold.

Here gold (Au_{197}^{79}) appears more stable than quicksilver (Hg_{200}^{80}).

The matters obtained on the helium basis have thermoelectronic emission especially. Beryllium is referred to them, in particular, which consists of two helium atoms $Be_{9.01218}^{4}$, carbon composed of three helium atoms ($C_{12.011}^{6}$), oxygen composed of four helium atoms etc.

Many elements of D.I. Mendeleyev's table represent not the other thing, but a combination of helium atoms. Knowing, that helium is the inert matter in a chemical ratio, it can be supposed that its all other matter derivatives should be also chemically inert. Only neon, argon, krypton, xenon, radon, as well as iron, platinum, tungsten, titanium and some other matters under certain conditions have actually chemical inertness, except of helium.

Carbon and oxygen should be chemically inert matters as well. Naturally, the inertness of diamonds and carbon (graphite) deposits is proved by time. So, the diamond crystals are without any change in deposits for centuries.

Oxygen is the inert matter as well. And that fact, that oxygen is coupled to hydrogen, points not to oxygen chemical ability, but that oxygen tends to be neon, as more stable structure. But two electrons and four nucleons are not enough for oxygen to reach this aim. Therefore deutoxide is more stable in comparison to ordinary water, as two deuterium atoms as for field structure are closer to helium, than two atoms of light hydrogen, and on the other hand, two deuterium atoms as to an atomic structure are very close to helium.

Thus, I suppose, that all atoms with even numbers are chemically inert, and all those chemical combinations, which are available in the chemical catalogues,

it is necessary to consider as stable geometrical forms similar to inert matters of the eighth column of

D.I. Mendeleyev's table. Really, for example, the hydrochloric acid HCl as for the number of electrons and neutrons is close to argon, the etching acid HF is close to a neon, the sulfuric acid H_2SO_4 is close to a xenon, to be exact, to tin, but nitrogen is close to germanium. This supposition is confirmed as for similarity properties as well, which are characterized also by similar matter dissolubility in each other.

The thermoelectronic emission especially confirms the pronounced supposition of a non-chemical nature of all organic and majority of non-organic matters.

The thermoelectronic emission weakens at constant temperature. However it can be retrieved again, if to increase the matter temperature greatly, and then return it again into the initial state. Such jumping throw of a thermal energy again forces atom neutrons to turn into mesons having an electron charge, and it is released from electrons without electric charges accumulation due to it.

The thermoelectronic emission property, as it was established by me, is convertible, as the Peltye and Zeebek's effects are convertible.

We discover the electron radiating from matter due to heating at the thermoelectronic emission, at which the charge ability misses, as it happens at a photoeffect.

However, if thermoelectronic emitting matter can be irradiated with electron current, so it is possible to detect hard and light hydrogen atoms in the matter.

In other words, thermoelectronic emitting effect is a complex of two effects: 1) the thermonuclear synthesis effect (TSE) and 2) the effect of electronic disintegration (EED), at which the heat beams convert light hydrogen into a deuterium, helium, beryllium, carbon, oxygen etc., and vice-versa the electron current disintegrates all composite matters into simple and, mainly, hard and light hydrogen.

These two effects of a thermoelectronic emission, which were detected by me, are basic in betasynthesis processes.

Paying attention to EED, we can remind, that the easier is the matter, the more clearly are the effects TSE and EED discovered in it. Really, it is known in nuclear physics that heavy deuterium hydrogen (D) or deutoxide (D_2O) on its basis, as well as carbon (C_2), oxygen (O_2) and other matters are the best electron absorbents. Therefore graphite rods of carbon and deutoxide already at the beginning of atomic engineering development were used for nuclear chain processes retardation.

On the other hand, it was noticed by me at many chemical reaction analysis, that chemical reactions go much faster in a weak electron current. It seems that the catalysis, that is chemical reaction acceleration, is stipulated not by any catalyzer physical property, but their ordinary property to radiate electrons under the thermal energy action. Naturally, good catalyzers are such matters, which have considerable TSE and EED.

If to protect catalyzers from reagents by a thin film passing electrons freely, the best catalyzers will be those matters, which exhibit TSE the most greatly. And such matters, as platinum, can be without self-maintained protection, since they are chemically inert. On the contrary, those matters, which realize EED brightly, slow down chemical reactions essentially. They are called as inhibitors in chemistry and physics. In particular, lignin is referred to them, for example.

Knowing that the inhibitors, as a rule, consist of carbon, hydrogen and oxygen (lignin is an example), it is possible to ask a question: "Why do the inhibitors absorb free electrons in space so greedy?"

The following statement can be the answer: "All inhibitors, as well as all organic life, require free electrons precisely in the same way as free photons for keeping its habitability".

The electron necessity is stipulated by betasynthesis laws in the first case, and by photosynthesis laws in the second case.

If the lost plant electrons at photosynthesis would not be completed at the expense of a thermoelectronic emission, so the plants would be under huge electric fields action. Plants are under electric fields affect in real conditions (but these fields are minor), which naturally are ordinary thunderstorm summer discharges sometimes.

It is clear from here, that the photosynthesis in plants is impossible without TSE affect. Photo and betasynthesises are the main phenomena in a biomass synthesis. Protein is major, certainly. But protein synthesis is carried out according to the negative chemistry laws, i.e. according to neutralization laws with power and water loss. It is clear from here, that entropy would make impossible the protein producing without the phenomena of photo and betasynthesis at neutralization reaction. Really, the neutralization reaction goes with power loss like photons and electrons, and photo and beta synthesis produce them.

4. Comparative data of photo and betasynthesis

The photosynthesis is stipulated at the expense of photoeffect, and betasynthesis at the expense of TSE and EED. Though TSE and EED have a direct relation to all carbon polymers, both vegetative and animal. In other words, TSE and EED are common as for vegetative organic matter composed of carbon, oxygen and hydrogen (for example, lignin, cellulose, glycosides, alcohols, acetones), and for animal organic matter (for example, collagen, connective tissues, vinegars, glycogens and so on).

The photosynthesis phenomenon is proper to those

organic matters, in combination of which there are photoactive materials. In particular, magnesium, zinc, selenium, germanium, strontium, quicksilver, cesium are referred to those.

The betasynthesis phenomenon will be realized on other microelements, which are capable to radiate electrons not under light affect, but under the affect of molecule heat move, i.e. at the expense of a thermoelectronic emission, to be exact, at the expense of thermonuclear synthesis, i.e. the hydrogen transformation into helium.

The photosynthesis is made, for example, in a vegetative cell chlorophyll, and betasynthesis — in the animal cell hemoglobin.

Photosynthesis products (taking into account TSE and EED affect) are: cellulose, lignin, protein, starch, carbohydrates, fats (vegetable oils), glucosides, saponins, tannic matters, bitters, alkaloids (alkaline-like nitrogen containing matters) etc.

Betasynthesis products are: connective tissues reminding cellulose, collagen (cementing agent similar to lignin), animal protein (similar to vegetative protein, but distinguished from them, as the protein of a chicken egg differs from protein of grain flour), animal sugar (honey, lactic whey), glucogens, glycogens, enzymes, hormones, amino acid (acid-like nitrogen containing matters similar to alkaloids), pepsins, peptides etc.

There is assimilation of carbon dioxide and hydrogen from water during photosynthesis, and thus oxygen is released partially.

The effect EED participates primarily in betasynthesis processes, at which an exuberant atomic hydrogen generating during this process, takes away oxygen from a gaseous aerial mixture or water and rejects carbon dioxide.

Knowing about it that the iron divalent is in a hemoglobin porphyry nucleus, it can be asserted that iron itself can be disintegrated from external electrons affect according to the formula at the expense of EED effect:

$$Fe = F_2O = FCl, \tag{4}$$

$$Fe^{26}_{56} = 2F^9 + O^8 = 3O^8 + 2H^1 = 4C + 2H, \tag{5}$$

or:

$$Fe^{26-2}_{56} + O_2 + 2e^- = F_2O_3 = \\ = H_2O + O_4 = H_2O_2 + O_3. \tag{6}$$

In other words, one iron atom is torn apart from combination in a porphyry nucleus under two electrons affect and, basically, can be disintegrated into carbon atoms, oxygen atoms and hydrogen atoms. The atoms of carbon and oxygen form carbon dioxide CO_2, and the atomic hydrogen form water coupling with oxygen of a surrounding medium.

All this reaction of iron disintegration or its isostere F_2O or FCl goes with lots of thermal energy release. Due to this energy, an organism can be warmed.

Thus, the expressed supposition of thermonuclear iron disintegration in betasynthesis process is, at the first sight, improbable. Nevertheless, there is nothing improbable in it. Soon anybody will have no doubt, that major energy fuel in animal origin cells is not oxygen, but IRON!!! To be exact it is the covalent combination of fluorine and oxygen according to the formula: $Fe = F_2O$, either $Fe = ArO$, or $Fe = FCl$.

The similar nuclear reaction goes at other element conversion as well. So if nitrogen N_2 will contain in dodecahedral clusters such as $C_{20}H_{20}$, it is possible to detect the reaction like the following under heat electrons affect:

$$\begin{array}{ccc} & H & \\ \nearrow & & \searrow \\ N^7 & + & N^7 = C^6 + O^8 + W. \end{array} \tag{7}$$

The reactions in the formulas (5)-(7) occur not with ordinary, but deutoxide, in which it is necessary to write a deuterium, tritium etc. instead of ordinary hydrogen, so that the atomic weight of iron or nitrogen will coincide with atomic weight of reagents.

The similar reactions of thermonuclear disintegrating can be written down for hemoglobin as well, at which there is not iron in porphyry nucleus (or its izosteres or FCl), but copper (at spiders, octopuses), nickel (in lymphaplasma), cobalt (in lactic glands), iodine (in thyroid glands) etc.

The betasynthesis peculiarity is that carbon for biomass reproduction of an animal origin is taken not from an atmosphere, but immediately after originating in the thermonuclear disintegrating reaction. Naturally, if molecular betasynthesis is told about. If to consider a cell level, so the material for a biomass synthesis will be used partially from a surrounding medium biomass, both vegetative and animal.

Summing up the brief discussion of photo - and betasynthesis, it is possible to conclude, that these two natural phenomena are subjected completely to a duality principle.

The solar energy, presented as two streams (photons and electrons), will be converted to other matter kind (into a biomass) due to the photo - and betasynthesis phenomena. And, biomass is not a chemical product in itself, as it is reproduced (though in the distance) in thermonuclear fusion reactions (photosynthesis) and thermonuclear disintegrating reactions (betasynthesis). In other words, the life of plants and animals is a thermonuclear reactions yield of stars. And, despite of a photo and betasynthesis distinction, these two phenomena can not exist one without another, as the vegetative world can not exist without the animal world. And the animal world can not exist without the vegetative world.

On the other hand, the life phenomenon is a powerful natural phenomenon. As photo and betasynthesises are made in any conditions with the formation of water, oxygen, carbon dioxide and other elements, the life on the Earth is not the exception. On the contrary, basically it spreads everywhere around any shining Star.

Two properties of thermonuclear synthesis, and also photo and betasynthesises allow to realize only two types of the elementary cell-like essences in Nature:
a) cells of plant origin (CPO),
b) cells of animal origin (CAO).

The plant world is made of plant origin cells, and the world of animals, birds, fish, reptiles, worms, insects is made of CAO cells.

In other words, the life is possible only as flora (blossoming plants) and fauna (dwelling).

The third kind of cell-like life can not be in principle.

If the pointed out idea is true, it is possible to give the answers to many questions.

For example, to what cells can the pathogenic microorganisms and cancerous cells be referred?

The answer can be completely particular: they can be referred either to CVO, or to CAO, as the third variety of cells does not exist.

The author studied the pathogenic microorganisms' existence environment for a long time and, finally, has come to the conclusion, that all of them are divided also into two varieties CVO and CAO

Photo - and betasynthesises were confirmed by many explorers experimentally a lot of times. So, the French scientist Kervran pointed to the nuclear conversion occurrence in vegetative and animal cells in 1962. In particular, he pointed, that the molecular nitrogen in cells is converted into carbon oxide (CO). The sodium oxide according to Kervran is converted into potassium in organisms, and potassium is converted into calcium. Kervran showed also, that the magnesium oxide is converted into calcium as well. Many schemas of nucleus transforming are given in Kervran's six-volume works, but Kervran's ideas were not supported by the France scientific community, practically nobody knows about them.

Photo and betasynthesises, both theoretically and practically, are the further confirmation of Kervran's ideas, though have its own value. The theory that we call as the

"Chemistry of a second generation at a nuclear level", which gives clear imagination about nuclear conversions in low energies was developed by us (I, my wife Nelly Andreevna and my son Maxim Borisovich) for ideas understanding of nuclear conversions in energies about electron-volt units.

This theory essence is in those, that ions are the chemical ability carrier in reactions, bound, as a rule, not by one electron or positron (proton), but a major group of charged elements. Water is original in the second-generation chemistry, like lithium dioxide (Li_2O). Really, gaseous hydrogen is converted into helium, lithium, beryllium and all other elements at Stars formation. The most probable composition in this process is lithium dioxide (Li_2O), which turns into silicon under gravitation forces affect according to the schema:

$$Li_2^3O^8 \rightarrow Si^{14}. \tag{8}$$

In other words, silicon called as the semiconductor sometimes, appears nothing else but lithium water, i.e. pressed by lithium dioxide.

If our supposition is correct (it was proved by us later), so silicon should dissociate as ordinary water, i.e. under energy stimulation affect it should be disintegrated into ions, so it has appeared: silicon, really, is disintegrated into two ions: 1. A positive lithium ion and 2. A negative ion of a hydroxyl group - OLi under electric fields affect as well. If the dissociation energy of ordinary protium water compounds electron-volt units, so silicon dissociates in the range of kiloelectronvolt energies.

Silicon opportunity to dissociate into two ions (lithium and hydroxyl group OLi) opens out major opportunities of formation, both acids, and alkalis, and together with it, the whole huge chemistry at the nuclear level. Really, if we pay attention, for example, to etching acid (HF), so the etching acid will look like LiF in a case with lithium ion. Now, if to imagine, that lithium fluoride combinations (LiF) were under major gravitation loads of a Star being formed, lithium fluoride will turn into magnesium according to the schema:

$$Li^3 + F^9 = Mg^{12}. \tag{9}$$

Similarly hydrochloric acid, at which lithium is available instead of hydrogen, it will turn into calcium in the Star entrails according to the schema:

$$Li^3 + Cl^{17} = Ca^{20}. \tag{10}$$

Accordingly it is possible to present other elements of the periodic law by D.I. Mendeleyev as acids or alkalis. For example, the potassium alkali is usually presented as $KOLi$. In our case, as the hydroxyl group is presented as OLi, the combination $KOLi$ will turn into zinc according to the schema:

$$K^{19} + O^8 + Li^3 = Zn^{30}. \tag{11}$$

As it is possible to show alkali on other alkaline elements. When the element substance is interpreted, as other element combinations, the neutralization reaction becomes clear easily. Let's take, for example, magnesium as etching acid, and we shall carry out the neutralization reaction on the basis of zinc, i.e. potassium alkali. At the beginning we should take lithium water, i.e. silicon, melt it (the silicon melting point is equal to 1416C) for this purpose, then we should enter magnesium into it. All this should be made in a

vacuum, in order that the magnesium would not fire. When the solution of etching acid, i.e. magnesium, will be obtained, it is necessary to enter alkali into it, i.e. zinc, also dissolved in water, i.e. in molten silicon. If the water, i.e. silicon, will be ionized enough, the neutralization reaction between magnesium and zinc will go according to the schema:

$$Mg + Zn = LiF + KOLi = \\ = Li_2O + KF = Si^{14} + Ni^{28} + W. \qquad (12)$$

As we notice, the neutralization reaction goes with lithium water formation, i.e. silicon, and salt of potassium fluoride, i.e. nickel. Thus about 2.5 MeV of energy W is formed, released like photons. Zinc with iron can be neutralized up to lithium water in general, i.e. up to silicon.

$$Fe + Zn = C_3O + CO_3 = C_4O_4 = 4\,(CO) = 4Si.$$

This reaction can be presented as follows:

$$Fe + Zn = SiC_2 + SiO_2 = Si_2\,(CO)_2 = Si_2\,(Si_2)\,.$$

Thus, the phenomena of photosynthesis and betasynthesis should be considered from the position of chemistry of the second generation at nuclear level that we shall do in the following paragraph.

5. Photonuclear synthesis

Producing of a vegetative biomass under photon affect is one of the greatest miracles of Nature, still not opened by the man, though people noticed from immemorial times, that the solar rays are one of the most main factors of plants growth. Subsequently science (we imply the truth learning process under the concept "science") has determined, that electrons irradiation is observed at photosynthesis, as well as at photoeffect. Ii is noticed also, that oxygen is released at considerable absorption of CO and CO_2 in this process. In general the photosynthesis results in producing of alkaloids, glycosides, proteins, fats, sugars, saponins, cellulose, lignin and other organic matters. Here it is important to notice, that the produced vegetative biomass has predominantly alcalinous nature. Naturally "alkaloids", according to definition, mean nitrogen containing alkaline-like matters containing amine group NH_2. In other words, the dwelling medium of plant cells tends to alkalization and forming of alkaloids and proteins on the basis of carbon, hydrogen, oxygen and nitrogen at photosynthesis. Though the metals (aluminum, copper, cobalt), iodine and other elements available are not excluded.

Magnesium and some other metals (for example, selenium, cesium, lanthanum, cerium etc.) are discovered in chlorophyll porphyry nuclei, as well as in cells of plant origin (CVO), the photosynthesis is not subjected to explanation from the position of contemporary chemistry and biology. Any little satisfactory explanations of the photosynthesis phenomena are obscure from the position of physics. Therefore the author offers his own explanation methodology of the photosynthesis phenomenon from the point of view of knowledge enlargement in the theory of cancer formation.

Not only free radicals are formed at photosynthesis, but also there are pseudo-nuclear processes, at which the hydrogen atoms transferring from one nucleus to another is carried out at the expense of photon affect. Two new elements are formed as a result of such interchanging, and, as a rule, the radiation energy releases in this reaction, accompanying by electrons emitting sometimes.

The nuclear reaction from photon affect is possible when the nuclei of reacting elements are apart about a radius of nuclear forces affect (10^{-13} cm) in the repulsion zone. These conditions will be realized in chemical combinations, in which nuclei have opposite charges. Let's consider some combinations, which fit the above-mentioned requirements and are capable to nuclear transformations under photon affect. The atoms of aluminum and oxygen are joined so tightly in the combination Al_2O_3 (corundum), that the hardness of corundum comes nearer to diamond hardness (corundum hardness is equal to 9 according to the Mohs' scale, and diamond hardness is equal to 10).

Thus, due to chemical combination, aluminum and oxygen atoms are pulled together in the interval of nuclear forces interaction in a molecule Al_2O_3, at which the electrons masses deformations are already observed. Naturally aluminum thermal ability is not only chemical reaction. Here we deal already with the original nuclear phenomena, at which low energy affects for stimulation of nuclear (pseudo-nuclear) reactions are enough. Here "pseudo-nuclear" reaction means hidden nuclear process with energies interchanging between nuclei. Therefore, if to affect on corundum (Al_2O_3) by absorption photons, so the originating of the following pseudo-nuclear reactions can be detected for nuclei of aluminum or oxygen.

The exchange reaction by hydrogen atom between aluminum nuclei according to the schema:

$$h\nu_p \rightarrow Al^{13}_{26.9815} \overset{\nearrow H^1_{2.0153} \searrow}{} + Al^{13}_{26.9815} = \\ = Mg^{12}_{24.966} + Si^{14}_{28.997} + W. \qquad (13)$$

As the nucleons balance is abided in the reaction (13), the released energy W is defined according to electron deformation. If the aluminum electron mass is equal $m_e = 0.0007084$ a. m. u., and the magnesium electron mass is equal $m_e = 0.0006555$ a. m. u. and the silicon electron mass is equal $m_e = 0.0005782$ a.

m. u., so the released energy W of the reaction will be calculated according to the Einstein formula:

$$W = c^2 \left(\sum M_1 - \sum M_2 \right). \quad (14)$$

where: c is the light speed ($c^2 = 931$); M_1 and M_2 are the masses of reacting particles in a. m. u.; W is the energy in MeV.

$W = 931(2 \times 13 \times 0.0007084 - 12 \times 0.0006555 - 14 \times 0.0005782) = 931(0.018144 - 0.0159608) = 931 \times 0.0024516 = 2.3$ MeV.

Corundum can turn into the tin solid izostere composed of five neon atoms under photon affect according to the schema:

$$h\nu_p \rightarrow Al_2O_3 \rightarrow 5Ne \rightarrow Is^{50}. \quad (15)$$

The tin izostere Is^{50} is formed as a glass (transparent glass with forgeable tin properties) in this reaction. This reaction was realized in an antiquity at deriving a forgeable glass from clay.

Aluminum will convert into magnesium and silicon, and corundum, accordingly, can turn into magnesium oxide and silicon dioxide in the reaction (13) according to the schema:

$$h\nu_p \rightarrow Al_2O_3 \leftrightarrow MgO + SiO_2 + W. \quad (16)$$

These transformations are especially characteristic in the geology of clays and sands.

Precisely the phosphate Na_3P and sodium sulfide Na_2S will be converted under photon affect. Thus, if to direct the phosphorus and sulfur absorption photons as exciting photons, so three and two hydrogen atoms can transfer to sodium nuclei from their nuclei. Phosphorus and sulfur turn into silicon, and sodium turns into magnesium at the expense of the hydrogen atoms transferring, for example:

$$\begin{array}{lll} Na^{11}_{22.9898} & \leftarrow H^1_{2.004} & \\ h\nu_p \rightarrow & \quad\;\; S^{16}_{32.064} & = 2Mg^{12}_{24.312} + Si^{14}_{30.086} + W. \quad (17) \\ Na^{11}_{22.9898} & \leftarrow H^1_{2.004} & \end{array}$$

The number of nucleons in both parts of the equation (16) is equal in this reaction. Therefore the released energy W will be defined only at the expense of electron and positron deformation. It will take place for this kind of transformation if to consider the electrons mass for $Na - m_e = 0.000759$ a. m. u., for $S - m_e = 0.0005216$ a. m. u., for $Mg - m_e = 0.0006555$ a. m. u., for $Si - m_e = 0.0005782$ a. m. u.

$W = c^2 \left(\sum M_1 - \sum M_2\right) = 931(2 \times 11 \times 0.000759 + 16 \times 0,0005816 - 2 \times 12 \times 0.0006555 - 14 \times 0.0005782) = 931(0.0260036 - 0.0238268) = 931 \times 0.0021768 = 2.027$ MeV.

As we notice from the calculation of (14) and (17), the generating energies are about 2-3 MeV, while the absorbed energy hp of an optical wave range is the tenth fractions of MeV. Thus, the photosynthesis phenomenon results not only in matters transforming, i.e. to chemical element reversibility, but to the energy generating as well.

One of basic elements at photosynthesis in plants is nitrogen, which is inlet as fertilizers (for example, as NH_4NO_3). Nitrogen at particular chemical reactions comes into the exchange reaction according to the schema:

$$N^7_{14.0067} \overset{\nearrow H \searrow}{} + N^7_{14.0067} = C^6_{12.01115} + O^8_{15.9994} + W. \quad (18)$$

Here: $W = c^2 \left(\sum M_1 - \sum M_2\right) = 931(2 \times 14.0067 - 12.01115 - 15.9994) = 931(2 \times 8.0134 - 28.01055) = 931 \times 0.00285 = 2.65$ MeV.

The reaction (27) is remarkable that it demonstrates the example of chemical element reversibility in plant habitability from the point of view of nitrogen accumulation as energy carrying element and carbon monoxide source as basic constructive substance of a vegetative biomass.

It is important here to notice that the pseudonuclear nitrogen transformation has also the top value in biology of animal cells. If alkaloid and protein nitrogen is energy carrying element in vegetative cells, so the same nitrogen is energy carrying element in amino acids and protein for cells of an animal origin. It is noticed, that nitrogen is captured also at breathing in lungs, except of oxygen, which being converted into CO, simultaneously releases major nuclear energy, necessary for compensation of heat losses, the heat release serves for the same purpose also at neutralization reaction. Otherwise the lung tissue would get frozen from its own breathing, as much more energy will be released at an exhalation, than it is produced at oxidizing reactions.

The photosynthesis in vegetative cells is especially brightly expressed at photoresponsive substances available. It is possible to call such elements as: selenium, silver, cesium, zinc, lanthanum, cerium and other lanthanides among the elements referring to photoresponsive. But even the compositions of the enumerated and other substances have greater responsiveness. It is possible to take all combinations of silver with halogens, sulfides of zinc, element combinations of the third and fifth groups (for example, gallium arsenide, indium - phosphorus in a mixture with germanium, boron - antimony in a mixture with germanium or silicon etc.) as an example.

Volatile fluorine combinations have good photosensitiveness. For example, hexafluorine of uranium UF_6 under photon affect can be converted into volatile combination of hexaneonidradon ($RhNe_6$).

The photosynthesis in plants is carried out in a rather wide frequency spectrum. It, in particular, takes

place in infrared range (in the range of wavelengths 2000-4000 Å), in an optical wave range (400-800 Å) and ultraviolet wave range (200-300 Å).

In particular, mountain plants grow at a lot of ultraviolet rays available best of all, since pseudo-nuclear processes go more effectively at shorter photon waves.

Cancer cells in human and animal organisms are reproduced at photosynthesis as well. Only this photosynthesis is made on ultraviolet, X-ray and gamma rays formed at the expense of cells betasynthesis of an animal origin (CAO).

The phenomenon of the periodic system element reversibility at photosynthesis, discovered by the author, allows to change the imaginations about cancer formation considerably.

Nuclear, to be exact, pseudo-nuclear transformations explain many hitherto unknown processes in vegetative cells. On one hand, the photosynthesis allows to solve the problem of vegetative biomass producing, and on the other hand - it opens many real ways of the fights with cancer new formations. However, we shall consider CAO betasynthesis from a pseudo-nuclear transformation positions as well before to stop on them, since photo and betasynthesises, being various phenomena, supplement the world's general understanding of physicochemical processes in biological objects altogether.

6. Batanuclear synthesis

The sun, except of photons, radiates powerful electron current and other particles as well.

The electron emission of the solar sphere, as well as photon emission, is vitally necessary, but not for vegetative cells, but for cells of an animal origin (CAO).

The photon outburst from hemoglobin protoplasm is observed at an electronic bombardment, the oxidizing reactions go well, nitrogen is assimilated, ammonia NH3 and carbon dioxide CO2 release. Biomass formation as protein, fats, sugars, collagen, amino acids, hormones and many other is made at betasynthesis as well as at photosynthesis, and at negative chemistry also. Characteristic for an animal biomass is its sour ability. For example, preliminary protein combination (alkaloids) are alkaline-like nitrogen containing substances. The amino acids are nitrogen containing preliminary protein substances also, but they have acidic reaction almost everyone. Precisely, proteins, fats CAO, and carbohydrates are acidic as well. Honey, lactic whey, the glycogens (glucogens), flour multisaccharids etc. are the examples of acidic carbohydrates.

In other words, the vegetative biomass becomes alkaline at photosynthesis, as the alcalinous amino acids and alkaloids are formed, and the animal biomass is oxidized at betasynthesis, predominantly by fatty acids.

Let's consider some betasynthesis examples in CAO, occurring at forming of hemoglobin, hemocyanin and other relevant substances of animal biomass.

The author has noticed in his experiments, that the reduced hemoglobin level is recovered by the substances not ferruginous, but cobalt containing. Really, the divalent iron (Fe) is in hemoglobin porphyry nuclei and, it seems the use of ferruginous vegetables inside the organism should fill iron deficit. However this deficit decreased noticeably at the use of sour cabbage containing not iron, but cobalt. Precisely the cobalt abundance in salted apples, carrots and apricots compensated the iron deficiency beneficially as well. Even sorrel and nettle, being made sour, eliminated the iron deficit very beneficially, though they are the major cobalt suppliers.

Cobalt atoms in combinations approach each other at such distance, at which the electronic bombardment results in the hydrogen atom transferring from one nucleus to another. One iron atom and one nickel atom are formed as a result:

$$\beta \rightarrow Co^{27}_{58.9332} \overset{\nearrow H^1_{2.1827} \searrow}{} + Co^{27}_{58.9332} = Fe^{26}_{56.9819} + Ni^{28}_{60.978} + W. \quad (19)$$

Here: $W = c^2\left(\sum M_1 - \sum M_2\right) = 931(2 \times 27 \times 0.000794 - (2 \times 60.0006944 + 28 \times 0.0007849)) = 931(0.042876 - 0.0400316) = 931 \times 0.0028444 = 2.65$ MeV.

The cobalt chloride will be converted easily into iron chloride under electron affect, throwing out an argon atom thus.

$$\begin{aligned} \beta \rightarrow Co^{27}_{58.9332} \overset{\nearrow H^1_{2.1827} \searrow}{} + \left(Cl^{17}_{35.453}\right)_3 = \\ = Fe^{26}_{56.9819} + \left(Cl^{17}_{35.453}\right)_2 + Ar^{18}_{36.9865} + W_1, \quad (20) \\ = Ni^{28}_{60.978} + \left(Cl^{17}_{35.453}\right)_2 + S^{16}_{32.064} + W_2. \end{aligned}$$

Similarly copper chloride turns into nickel and argon under electron affect according to the schema:

$$\begin{aligned} \beta \rightarrow Cu^{29}_{63.546} \overset{\nearrow H^1_{2.1912} \searrow}{} + Cl^{17}_{35.453} = \\ = Ni^{28}_{60.978} + Ar^{18}_{36.9865} + W_1, \quad (21) \\ = Zn^{30} + S^{16}_{32.064} + W_2. \end{aligned}$$

The released energy is calculated as to electron deformation. It is equal in this case:

$W_1 = c^2\left(\sum M_1 - \sum M_2\right) = 931(29 \times 0.0007523 + 17 \times 0.0007818 - 28 \times 0.0007031 - 8 \times 0.0007521) = 931(0.0449945 - 0.0332246) = 931 \times 0.0117699 = 11$ MeV.

Thus, it becomes clear, where divalent iron occurs in hemoglobin and nickel occurs in hemocyanin (lymph blood).

Here it can be noticed pertinently also, that nickel in plants can be accumulated at the expense of photosynthesis. For example, galmeevsky violet grows there, where there are copper and nickel sulfides scattering on the surface. The copper sulfide, as well as many other sulfides, is a strong alkaline substance. The reaction goes at photosynthesis according to the schema:

$$h\nu_p \to \left(Cu^{29}_{63.546}\right)_2 \overset{H^1_{2.1827}}{\nearrow\searrow} + S^{16}_{32.064} = \\ = \left(Ni^{28}_{60.978}\right)_2 + Ar^{18}_{36.9865} + W_1, \qquad (22) \\ = \left(Zn^{30}\right)_2 + Si^{14}_{30.086} + W_2.$$

Here energy W can be calculated at the expense of electron masses deformation

$W_1 = c^2\left(\sum M_1 - \sum M_2\right) = 931(22 \times 90.0007523 + 160.0005816 - 2 \times 28 \times 0.0007031 - 18 \times 0.0007521) = 931(0.052939 - 0.0529114) = 931 \times 0.000276 = 0.257$ MeV.

Alkali metals salts are subjected to betasynthesis as well, for example, $NaCl$ and KCl according to the schemas:

$$\beta \to Na^{11}_{22.9898} \overset{H^1_{2.0854}}{\nearrow\searrow} + Cl^{17}_{35.453} = Mg^{12}_{24.312} + S^{16}_{32.066} + W_1, \qquad (23) \\ = Ne^{10} + Ar^{18} + W_2.$$

$W_1 = c^2\left(\sum M_1 - \sum M_2\right) = 931(11 \times 0.000759 + 17 \times 0.0007818 - 12 \times 0.0006555 - 16 \times 0.0007363) = 931(0.0216396 - 0.0196468) = 931 \times 0.0019928 = 1.86$ MeV.

$$\beta \to K^{19}_{39.102} \overset{H^1_{2.058}}{\nearrow\searrow} + Cl^{17}_{35.453} = 2Ar^{18}_{36.9865} + W_1, \qquad (24) \\ = Ca^{20}_{41.16} + S^{16}_{32.064} + W_2.$$

$W_1 = c^2\left(\sum M_1 - \sum M_2\right) = 931(19 \times 0.0007265 + 17 \times 0.0007818 - 2 \times 18 \times 0.0007521) = 931(0.0270941 - 0.0270756) = 931 \times 0.0000185 = 0.017$ MeV.

The reaction (22) has major value in habitability of animal cells. On one hand, the sodium chloride ($NaCl$) gives energy as heat photons at betasynthesis, and, on the other hand, magnesium sulfide is one of the relevant components at alcalinous enzymes generating (for example, gall).

Both reactions, probably, will be utilized for heat balance regulation in an organism, on one hand, their slowing-down protects them from overheat, and on the other hand, Ca and S ensure the heat regulation in an organism. Not incidentally potassium chloride helps at the temperature increase, since the argon which is generated in reaction (13), is a powerful absorbent of many particles radiated at pseudo-nuclear reactions.

The calculation on isotopes demonstrates that the major part of reaction (13) goes with energy absorption.

It is interesting to notice here, that the alkalis of sodium and potassium easily accumulated by plants at photosynthesis, form, on one hand, water and argon having property to attract water from air, and, on the other hand, water and argon as well, slowing down the thermonuclear reaction. Therefore sodium and potassium are two essential alcalinous elements of negative chemistry stimulating and adjusting the biological processes CVO and CAO.

Let's give these reactions for their comparison with reactions (22) and (13).

$$h\nu_p \to Na^{11}_{22.9898} \overset{H^1_{2.08998}}{\nearrow\searrow} + (OH) = Ne + H_2O + W_1, \qquad (25) \\ = 2\left(H_2O\right) + W_2.$$

The sodium, giving a hydrogen atom, turns into neon and water in this reaction. However, argon representing neon and oxygen combination, selectively affects on water in the vaporous state and, taking energy from it, condenses. Therefore alkali $NaOH$ is always damp under photon affect. This alkali feature can be used effectively for making the grounds watering itself for droughty regions:

$$h\nu_p \to K^{19}_{39.9865} \overset{H^1_{2.058}}{\nearrow\searrow} + (OH) = Ar^{18}_{36.9865} + H_2O + W_1, \qquad (26) \\ = H_2H_2 + H_2O + W_2.$$

The potassium alkali turns into water and argon under photon absorption affect, and also into the combination H_2O_2, greedily absorbing water vapor energy, condensing it into water in this reaction, as well as in previous one. Both reactions go with oxidizing, i.e. from strong product alkalinity, especially H_2O_2 become acidic. This reaction is remarkable by those that there is alkali transformation into acid in it, and also neutralization according to negative chemistry.

Potassium alkali, as well as sodium, can be used effectively as well for making of fertilizers watering itself.

Phosphorus, fluorine, bromine, iodine, and also lanthanides play a major role in photo and betasynthesis as well.

Phosphorus ensures many nervous cells with energy, and also turns into silicon and sulfur in its transformation. The potassium combinations with bromine and iodine favor to calcium release under electrons affect, the necessary substance for collagen and bone tissue formation.

So one of phosphorus reactions is:

$$\beta \to P_2O_3 = SiO_2 + SO + W \qquad (27)$$

or

$$P^{15}_{30.9738} + \overset{\nearrow H^1_{2.06492} \searrow}{} P^{15}_{30.9738} = Si^{14}_{30.086} + S^{16}_{32.064} + W. \quad (28$$

The energy is defined according to electronic mas deformation.

$W = c^2 \left(\sum M_1 - \sum M_2\right) = 931(2\times15\times0.0005873 - 14 \times 0.0005782 - 16 \times 0.0005816) = 931(0.017619 - 0.0174004) = 931 \times 0.0002186 = 0.2035$ MeV.

Silicon dioxide and sulfur monoxide, generating at transformation (26), (27), form silicon and sulphurous acids playing a major role in salts insertion from an organism. Besides, these acids participate in nervous impulses transferring, that is especially important at providing of normal functional operations in a nervous system.

Betasynthesis is the most favorable in acidic media. Especially it is stimulated in the medium of chlorine ions[1], i.e. in seawater solutions, in which sodium, potassium, manganese and other matters are. So, if to dissolve potassium-manganese salt in seawater, the hydrogen atoms will torn apart from manganese atom and join to potassium atoms at betasynthesis among ions of chlorine and other halogens. Thus manganese will turn into chrome, and potassium will turn into calcium.

By the way, many inhabitants of seas and oceans use this pseudo-nuclear reaction, for example, lobsters, (see the newspaper "Soviet Youth" on December 1st, 1988, page 2, the article "Invisible man is the reality" by I. Mosin). The specified reaction is written down as:

$$K^{19}_{39.948} + \overset{\nearrow H^1_{2.1975} \searrow}{} Mn^{25}_{54.938} = Ca^{20}_{41.985274} + Cr^{24}_{51.996} + W_1, \quad (29)$$
$$= Ar^{18} + Fe^{26} + W_2.$$

As the reaction goes with nucleon number saving, so the energy can be determined according to electron masses deformation:

$W_1 = c^2 \left(\sum M_1 - \sum M_2\right) = 931(19 \times 0.0007265 + 25 \times 0.0006441 - 20 \times 0.0007063 - 24 \times 0.0006534) = 931(0.030906 - 0.0298076) = 931 \times 0.0010984 = 1.023$ MeV.

We see that the reaction (28) makes oceans to be rich with calcium, since it is reproduced immediately from potassium, or from potassium-manganese salts, or from bromides or potassium iodines, which is sufficient in seawater.

Hydrogen itself will be converted also under electron affect. For example, deuterium turns into helium with three nucleons under electron strikes and tritium available, releasing an energy quantum thus (Fig. 3). It is so-called a self-reproduction reaction of tritium hydrogen.

[1]Chlorine is radioactive. It is disintegrated spontaneously, radiating electrons, and turning into sulfur.

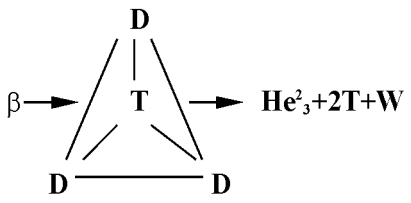

Figure 3: Transmutation of deuterium into helium

The nuclear conversions are made similarly at photosynthesis as well by photon affect upon phosphorus and other substances of D.I. Mendeleyev's table. Precisely there is a self-reproduction of poisons as well, for example, poison of AIDS, when one molecule of poison is reproduced into two molecules of poison.

The nuclear conversions of zinc, germanium, strontium, quicksilver, selenium, fluorine, cesium are made in the similar way. However, the released current of electrons and oxygen will be observed not at the expense of the photoeffect of the substances and magnesium called, but at the expense of the thermonuclear synthesis effect, converting the listed substances into heavier atoms in all cases of photosynthesis.

As animal cancer cells in some extent correspond to vegetative origin cells, so it is possible to discover them, obviously, according to an electronic background with sensitive betadosimeters.

7. Conclusions

Photo and betasynthesis, resulting in chemical element reversibility, are one of the basic habitability forms of biological substances, they dominate at cancer nature definition at the same time, and also strive with it.

Spacetime & Substance, Vol. 4 (2003), No. 3 (18), pp. 114–122
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SOME REMARKS TO RELATIVISTIC KINEMATICS

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Received May 23, 2003

The paper is devoted to systematic criticism of the fundamentals of the special relativity theory (SRT). A series of new (and known) logical contradictions of kinematic SRT concepts is considered: the paradox of antipodes, the belt-driven transmission, a loop with current, a rod sleeping etc.

1. Introduction

It may seem that the relativity theory (RT) has been firmly integrated into the modern physics, so that there is no need to "dig" in its basement, but it would be better to finish building "the upper stages of a structure." One can only "stuff the bumps" when criticizing RT (recall the resolution of the Presidium of the USSR Academy of Sciences, that equated the RT criticism to the invention of the Perpetuum Mobile). The solid scientific journals are ready to consider both the hypotheses, which can not be verified in the nearest billion of years, and those hypotheses, which can never be verified. However, anything but every scientific journal undertakes to consider the principal issues of RT. It would seem the situation has to be just opposite. Because RT is being teached not only in high schools, but also in a primary school, at arising even slightest doubts all issues should be seriously and thoroughly discussed by the scientific community (in order "not to spoil young hearts").

Note that during the RT life time the papers have repeatedly appeared, which contained some paradoxes and criticism of relativistic experiments; the attempts were undertaken to correct RT and to revive the theory of ether [1-15]. However, the criticism of RT had only partial character, as a rule, and affected only separate aspects of this theory. It should be recognized that, as against the criticism, there exists the professional fundamental apologetics of RT [16-26]. Therefore, the main purpose of the author was to present a successive, systematic criticism of RT just resting upon a fine apologetics of this theory. This task has been fulfilled step-by-step beginning with the works [27-30], in which the author considered in detail the RT underlying experiments [27], the baseline kinematic concepts of the special relativity theory (SRT) [27-29] and of the general relativity theory (GRT) [30].

We have been learned for a long time to think, that we are able to live with paradoxes, though the primary "paradoxes" have been reduced by relativists rather truthfully to some conventional "strangenesses." In fact, however, everyone understands that, if a real logical contradiction is present in the theory, then it is necessary to choose between the logic, on which all science is founded, and this particular theory. The choice can obviously not be made in favor of this particular theory. Just for this reason the given paper begins with logical contradictions of RT, and the basic attention is given to logical problems here.

Any physical theory describing a real phenomenon can be experimentally verified according to the "yes – no" principle. SRT is also supported by the approach: "what is experimentally unverifiable – it does not exist." Since SRT must transfer to the classical physics at low velocities (for example, for the kinematics), and the classical result is unique (it does not depend on the observation system), the relativists often try to prove the absence of SRT contradictions by reducing the paradoxes to a unique result, which coincides with classical one. Thereby, this is a recognition of the experimental indetectability of kinematic SRT effects and, hence, of their actual absence (that is, of the primary Lorentz's viewpoint on the auxiliary character of the relativistic quantities introduced). Various theorists try to "explain" many disputable RT points in a completely different manner: everybody is allowed to think-over the nonexistent details of the "dress of a bare king" by himself. This fact is an indirect sign of the theory ambiguity as well. RT claims to be not simply a theory (for example, as one of computational methods as applied to the theory of electromagnetism), but the first principle, even the "super-supreme" principle capable of canceling any other verified principles and concepts: of space, time, conservation laws, etc. Therefore, RT should be ready for more careful logical and experimental verifications. As it will be shown in this paper, SRT does not withstand logical verification.

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The relativity theory (as a field of activity) is defended, except the relativists, also by mathematicians, who forget that physics possesses its own laws. First, the confirmability of some final conclusions proves nothing (as well as the validity of the Fermat theorem in no way implies the correctness of all "proofs" presented for 350 years). Second, even in mathematics there exist the conditions, which can hardly be expressed in formulas and, thus, complicate searching for solutions (as, for example, the condition: to find the solutions in natural numbers). In physics this fact is expressed by the notion termed "the physical sense of quantities." Third, whereas mathematics can study any objects (both really existing and unreal ones), physics deals only with searching for interrelations between really measurable physical quantities. Certainly, a real physical quantity can either be decomposed into the combination of some functions or substituted into some complex function, and then we can "invent" the sense of these combinations. But this is nothing more than the scholar mathematical exercises on substitutions (irrespective of their complication), which have nothing in common with physics.

Section 2 will present the criticism of relativistic concepts of time, space and other aspects of relativistic kinematics. Section 3 contains the conclusions.

2. Criticism of Some Aspects of the Relativistic Kinematics

Now we remind, how the erroneousness of RT kinematic concepts can be proved most easily. For the "yes-no" — type results only one of different evidences of two observers could be true. Therefore, at least one of moving observers would be wrong in mutually exclusive judgements. However, the situation can always be made symmetrical with respect to the third resting observer. Then his evidences will coincide with the classical (checked for $\mathbf{v} = 0$) result, and in this case the evidences of both first and second observers should transfer to this result. However, since both the first and second observer moves relative to the third one, all three their evidences will be different. Owing to situation symmetry, both the first and second observer occurs to be wrong in his judgements, and only the third, resting observer describes the true (classical) result. Exactly in this manner the inconsistency of the concept of time (the time is irreversible!) was proved in the modified paradox of the twins [27, 30], as well as the inconsistency of the "relativity of simultaneity" concept [29]. (Note that the space-time diagram [21] does not change the physics of even conventional paradox of the twins: all additional aging of Earth's inhabitant arises suddenly (!), when the motion of an astronaut changes at the far point and is only geometrically expressed as the change of lines of simultaneity).

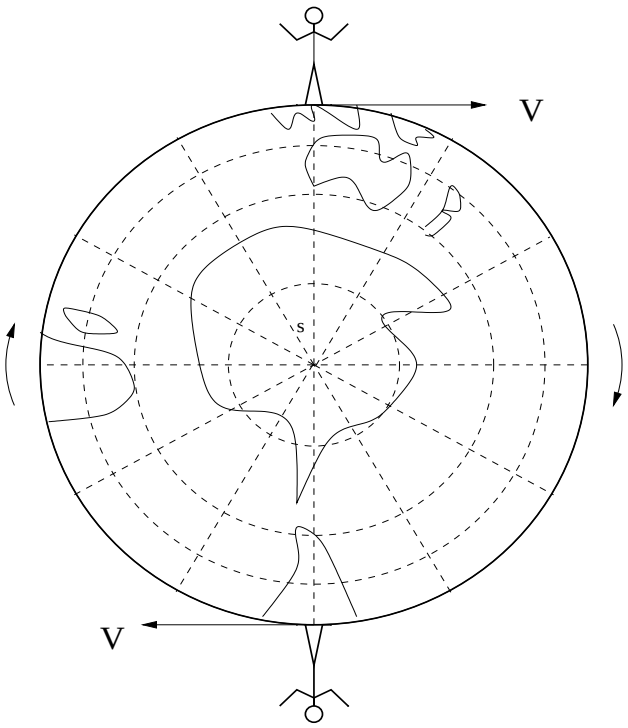

Figure 1: The paradox of antipodes.

In the given paper we shall follow another way. We begin with the concept of time. The erroneousness of SRT is proved very simply by the whole life of mankind on the planet Earth. Let us consider the elementary logical contradiction of SRT - the paradox of antipodes. Two antipodes situated at the equator (for example, one person in Brazil, the other one - in Indonesia) differ by the fact, that due to the Earth rotation they move relative to each other at constant speed at each time instant (Fig. 1). Therefore, despite the obvious symmetry of the problem, each of these persons should grow old or grow young relative to another one. Does the gravitation hinder? Let's remove it and place each of our "astronauts" into a cabin. Each person can determine the time on such a "roundrobin" (as well as on the Earth) from the direction to the far star, which is motionless with respect to the roundrobin center, and from the period of intrinsic rotation of a roundrobin. The running of time will obviously be identical for both "astronauts." The time can be synchronized by the calculation technique knowing the period of revolution (all these problems are technological, rather than principal). Let's increase the linear speed $v \to c$ for amplifying the effect (for example, in order that according to SRT formulas the difference in time be "running up" 100 years for one year). Does the centrifugal force (acceleration) hinder? Then we shall increase radius R of the roundrobin, so that $v^2/R \to 0$ (for example, in order that even for 100 years the overall effect from such an acceleration be many orders of magnitude

lower, than the existing accuracy of its measurement). In such a case none of experiments can distinguish the motion of antipodes from rectilinear one. And, further, if you trust in the relativity (either according to SRT or according to Galileo - indifferently), then you can transfer the motion of one of antipodes, in a parallel manner, closer to the other antipode and forget about the roundrobin model at all. Obviously, the reverse mental operation can always be performed for any two motions as well. Namely, we can perform parallel transfer of one of trajectories to a great distance $R \to \infty$ and "bridge" the motions by some "roundrobin." So, will "the patient be alive or dead" after some years? And who is more pleasant for you - the Brazilian or Indonesian? The full symmetry of the problem and full failure of SRT! Note, generally speaking, that the unique character of time cancels the principality of the issue of its synchronizing: the watch can, for example, be worn with yourself.

The time slowdown in SRT is nothing else, but the apparent effect. Remind that for a sound the duration of a hooting of trumpet Δt also depends on the velocity of a receiver relative to a source (a trumpet), but nobody makes the conclusions on time slowdown from this fact. The fact is that observer's "decision" to move at any velocity is in no way bound causally with sound emitting processes (as well as with other processes in a trumpet). Let a singer be continuously singing a song in the resting atmosphere, and his twin brother be moving away from a singer at about the speed of sound v_s : $\alpha_1 \equiv v/v_s \approx 1$, and then he will move toward a singer (with the same ratio α_1). Though the song will be distorted, nobody had yet recorded more rapid aging of a singer. Let now we modulate with the same song the light in pursuit of the twin brother, who departed on a rocket at about the speed of light, but with the same numerical value $\alpha_2 \equiv v/c = \alpha_1 \approx 1$. Now the twin brother will listen the same distorted song. Why the situation must change in this case, and the "home seating" brother must grow old? And, if some living organism will be characterized by some certain radiation frequency, that distinguishes him from the dead organism, then, really, because of your motion (because of the Doppler effect) you will first certify the death of an organism, and then his resurrection? Or it is necessary to postulate the change of objective characteristics of an object, which is not bound with you causally?

Now we make some comments concerning Einstein's time synchronization method. The transitivity of time synchronization by Einstein's method takes place for the trivial case of three mutually resting points. If, however, the points (not lying on the same straight line) belong to the systems moving relative to each other in different (not parallel) directions, then the synchronization procedure can become uncertain: for what time instant the watch can be considered to be synchronized? For the beginning of the procedure, for its termination or for an intermediate instant? Even for the points lying on the same straight line Einstein's method rests upon a completely unverified (experimentally) concept of equality of the speed of light in one and in a directly opposite direction. Actually, the synchronization occurs to be either a half-done calculation procedure, or a multi-iterative process, because the synchronization is performed for two selected points only. These deficiencies are absent in the method of synchronization with a remote source disposed at a middle perpendicular [27]. It allows one to synchronize the time experimentally (rather than computationally), without attracting additional hypotheses, to a prescribed accuracy throughout the given segment (even on a flat section) at once.

Though the "relativity of simultaneity" concept was considered in detail in [27, 29] and its erroneousness was also demonstrated, nevertheless, we note that even within the SRT framework this concept is highly restricted: it is applicable to two separated events only (there are no intersecting original causes, no intersecting aftereffects, and, generally, we are not interested in any additional facts). Indeed, even for these selected points the light cones have intersections, to say nothing of all other points in space and time. In fact, we have continuous chains of causally bound (and unbound) events occurring with multiple intersections through every point of space and time (not every reason, of course, results in a consequence at a speed of light). And all this real (different in scale!) time grid is interdependent for the whole space. Therefore, in the general case we can not change (by choosing the frame of reference) the order of succession of even causally unbound events (in any case, this changing would be reflected somewhere).

Now we proceed to the time measurement units. Certainly, for a separate phenomenon within the framework of some mathematical model any customary quantity can be described in various measurement units and in various scales (both uniform and non-uniform, for example, in the logarithmic scale). This is basically determined both by the convenience of description for the given model, and, as in the case of generalization, by the possibility of using the same quantities for the other physical phenomena and mathematical models (the matching of various fields of physics). However, Taylor and Wheeler's [21] sarcasm concerning the "sacred units" is completely inadequate. Certainly, we can introduce the factor for converting the time into meters. But this factor is not obliged to be the speed of light: for example, it can be the velocity of a pedestrian. Both aforementioned velocities have, quite equally, no relation to acoustic, thermal phenomena, to hydrodynamics and to many other fields of physics. It is possible to express, generally, all quantities (such as mass, charge, etc.) in meters. However, all these "various meters": 1) can not be summed up, 2) are not interchangeable, 3) very rarely appear in some joint combinations and

4) the same combination is unsuitable for various phenomena (for example, the interval has relation only to the law of light propagation in vacuum). All quantities can be made pure numbers. But in any case physics will not become mathematics. Physics does not study all illusory combinatorial "worlds" of equations, but only that rather small amount of them, which is realized in the nature (the basic problems of physics are: what interrelations are realized in the nature, why and what are the consequences of this).

Now we proceed to spatial concepts. Since all SRT conclusions follow from the invariance of an interval, then from the above-proved equality $dt = dt'$ and from (if we trust in it) relativistic equality $c = constant$ we obtain $dr = dr'$, and so it is not necessary to consider the concept of space further at all. However, to form the most complete viewpoint we shall, whenever possible, consider in this paper each disputable point irrespective of remaining ones. The contraction of lengths in SRT can not reflect a real physical effect, because various observers can see the same object in different manner (the non-objectiveness). Besides, the transition from one frame of reference to another can proceed rather rapidly, and this transition would be reflected in the whole (even infinite) Universe at once, which obviously contradicts the SRT-defended principle of finite rate of transmission of interactions (and, hence the principle of causality). Therefore, a similar contraction is nothing more, than supplementary mathematical manipulations with quantities, some of which have no physical sense. The real physical mechanism can not be attracted to explaining the length contraction process in SRT, since the contraction should take place immediately at any velocity $v \neq 0$. In reality, however, it is clear, that in the acceleration process the object can not only be pushed, but also pulled behind yourself, and in such a case, instead of contraction, we would have stretching (experimentally detectable, by the way!). At slow acceleration this state of stretching would remain the same with respect to the previous state of motion. Thus, the contraction will never begin.

A strange thing, related to length contraction in SRT, occurs with a belt-driven transmission (Fig. 2). From the viewpoint of the observers, on each of two free halves of a belt the cylindrical shafts should be transformed into ellipsoidal drums and then be turned as follows. The points of semimajor axes of ellipses, which are opposite to each observer, should approach each other (we obtain the non-objective description again). The contradiction takes place from the viewpoint of the third observer situated on a fixed stand. On one hand, the shafts should approach each other. On the other hand, however, the fixed bearing, which retains the spindles of shafts, should remain at the same place. But what is the thing, on which shafts' spindles will be kept? So, whether the real space is contracted or not? What must be artificially postulated for urgent

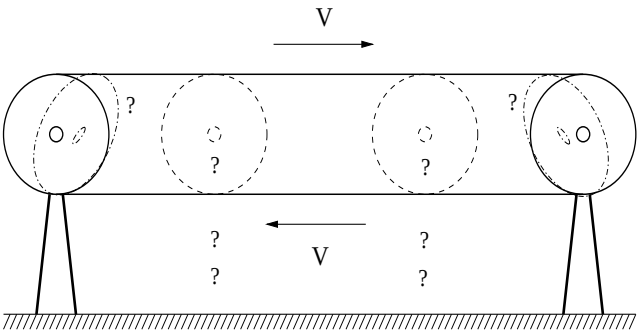

Figure 2: Illusions of belt-driven transmission.

"saving" SRT: various inserted spaces for shafts and bearing or the change of objective characteristics (the extensitivity) of a belt?

The attempt to hide from explaining the length contraction mechanisms behind the common phrase of type: "this is a kinematic effect of space itself" is unsuccessful because of uncertainty of the "contraction direction" (toward which point of space?). Really, the point of reference (the observer) can be placed at any point of the infinite space – inside, to the left or to the right side from an object; and then the object as a whole will not only contract, but also move toward the given arbitrary point. This fact immediately proves the inconsistency or unreality of the given effect. It is not clear, toward which end the segment will contract, if the moving system with two (moving) observers at segment's ends was made impulsively. The situation can not also be saved by the phrase about the "mutual uniqueness of Lorentz's transformations." This condition is quite insufficient. The mutual uniqueness of some mathematical transformation allows one to use it for convenience of calculations, but this does not imply in any way, that any mutually unique mathematical transformation has physical sense. Also strange is the process of stopping of contracted bodies. The questions arise: toward what side do their dimensions restore? Where has the contraction of space gone, if various remote observers could observe this body?

Many intuitively clear properties of physical quantities lose their sense in SRT. For example, the relative velocity ceases to be invariant. The particles, flying away along the same straight line at various velocities, form in SRT a complicated "fan of velocities" for a moving system. The isotropic velocity distribution in SRT ceases to be the same for the other moving system. No declared simplification does exist in SRT in reality.

Unreal in SRT is the consideration of infinite systems, such as a conductor with current, in "explaining" the appearance of additional volume charge (the game with infinities). In reality, the conductor can be close-loop (finite) only. In this case the explanation is not only complicated methodically, but also contradictory.

Let us consider a square loop with current (for example, a superconducting loop). The value of a charge of each electron and ion is invariant; the total number of particles is invariable too. How can change the density of charges in this case? Consider the motion of electrons from the viewpoint of a "system of ionic grid." According to SRT, the "electronic loop" should decrease in size (the contraction of lengths because of motion of electrons on each rectilinear section). It would seem that, owing to symmetry of the problem, the "electronic loop" should enter inside the "ionic loop." However, in such a case we would have a strange asymmetrical field (of dipole type) near the conductor. Besides, while moving at high velocity, the electrons and ions could appear on different sides from the observer. It is completely unclear, how such a transition through the observer (perpendicular to the motion of particles!) could take place at all? And by what forces the charged electrons (as well as the ions) would be retained together in a flux, not flying away to different sides? Even if we take advantage of the fitting SRT uncertainty (towards what end does the contraction occur?) for one side of a square, all questions still remain for its other sides.

Let us consider in detail the problem on 1-meter-long thin rod slipping over a thin plane having a 1-meter-wide hole [31] (see [21], exercise 54). It is rather strange, that any object should contract, turn or "deflect and slip down" in exactly the same manner, as it is required for SRT to be "saved" from contradictions at any cost (however, such an approach is an indirect recognition of principal indetectability of kinematic effects of SRT). What relation to the given problem can have a real rigidity of a rod? None! Let the rod be slipping between two planes (a sandwich), so that only a part of a rod freely hanging over a hole be participating in deflection. If the 1-meter rod can "deflect and slip down" into the hole shortened down to 10 cm (or 10 times), then in exactly the same manner the 1-kilometer-long rod (which should not fall-through neither in the classical physics, nor even in SRT in the plane's frame of reference) could also "deflect and slip down" into the hole. The declarative mentioning of the velocity of acoustic oscillations (for the balance establishment mechanism) is the "plausible" hiding of the truth. Let there are two identical real horizontal rods (at the same height). The first rod slips over the desktop (at the pressed position) and begins to hang downwards with one tip at instant $t = 0$. At this instant ($t = 0$) the second rod begins to fall freely downwards. Obviously, for any time instant $t > 0$ the second rod will be displaced downwards (or fall) to a much greater distance as compared to the deflection of first rod's tip (and, actually, SRT tries to replace the real body by a body with zero rigidity). For analyzed problems the relativistic velocities can only decrease the rigidity effect as compared to the case of low velocities, thus ever more approaching a real body to the model of absolutely solid body. Indeed, the rod is deflected in the direction perpendicular to the relativistic motion. Therefore, this problem is similar to the problem on massive body slipping over thin ice on a river: at low velocities the body can fall through (breaching of ice due to its deflection), and at rather high velocities the body can slip over ice without falling through (the ice deflection is small). The rate of acoustic oscillations is much lower, than the speed of light. Therefore, the molecules manage to efficiently participate in rod's deflection for shorter time as compared to the static case; that is, the deflection will be smaller. Let us take the width of the lower plane to be one molecule larger, than the displacement of rod's deflection (for some particular preselected material). At the second end of a hole we shall make a very shallow taper of the plane, so that the given rod could continue slipping over the plane (smoothly). What will happen to the 20-cm or 1-km rod for all former characteristics of the plane? And if we, for the former geometrical characteristics of the experiment, will take various materials for a rod (from zero to maximum rigidity)? Obviously, with precise adjustment of all parameters for one case it is impossible to eliminate the contradiction for all remaining cases. For "saving" SRT it is necessary either to postulate, that the rigidity in the experiment ceases to be an objective property of materials (but ad hoc depends on the observer and geometric size), or to postulate, that the second end of a hole jumps up ad hoc in the "necessary manner." Does the goal justify similar means?

A similar problem on passage of a rod, flying almost along axis X (now the rod is no longer pressed against the plane) through the niche of the same size has even entered the popular literature [32]. The relativists "eliminate" the contradiction in evidences of the observers by turning the rod in space (then the rod will pass through the niche in any case, as in the classical physics). However, the turning does not eliminate the Lorentzian contraction. Let us illuminate the niche from below along axis Z by the parallel beam of rays (for example, from a remote source). Let now rapidly pass the photographic film high above the niche parallel to the plate, but perpendicular to the mutual motion of a rod and a plane, that is, along axis Y. Then, in spite of rod passage, the result in SRT will all the same will be different for different observers. In the classical physics we would obtain the full darkening of the photographic film at the time of rod passage through the niche (this would be marked by a completely dark section on a light strip). A similar full darkening would take place in SRT from the viewpoint of the observer situated on a rod (since the niche will contract and turn). However, from the viewpoint of the observer situated on a plate the rod will contract and turn. Therefore, the full darkening will never take place. In such a case, who is right?

Some relativists believe that there is no length con-

traction at all – only the turning exists, for example, for a cube (i. e. they can not unambiguously agree even between each other). The absence of real turning of a cube (or the fact that this effect is only apparent) can easily be proved, if the cube will fly being pressed against a ceiling. Generally speaking, the distance to objects, their visible velocity and size can be determined, even with the help of the light, by several techniques which are "self-consistent" by themselves. For example, even for a single observer: from the angular size, from illumination, from the Doppler effect. But the obtaining of different values for the same physical quantity does not cancel at all the only true objective characteristics of a body and its motion (under which the instruments are calibrated).

The SRT's system of watches and rules is inconvenient both theoretically and practically, since it supposes that all the data are gathered and analyzed (interpreted!) somewhat later. The uniqueness of interrelation between the classical Newtonian and relativistic Lorentzian coordinates does not imply automatic consistency of latter ones (just in this, physical sense consists the distinction of physics from mathematics). For example, we could use in all SRT formulas the speed of sound in air instead of speed of light and consider the motions on the Earth at subsonic velocities in resting air. However, the inconsistency of similar transformations (for the time) would be immediately revealed in the experiment. This fact demonstrates the hazard of formally mathematical analogies for physics.

For "justifying" the relativistic contraction of lengths Fock [20] discusses as follows. In the motionless (fixed) coordinate system the lengths (tips of a segment) can be measured non-simultaneously, but in the moving system they must be measured simultaneously. From the invariance of the interval

$$(x_a - x_b)^2 - c^2(t_a - t_b)^2 = (x'_a - x'_b)^2 - c^2(t'_a - t'_b)^2$$

at the choice of $t'_a = t'_b, t_a \neq t_b$ we obtain $|x_a - x_b| > |x'_a - x'_b|$. But in such a case, why we can not choose $t_a = t_b$ arbitrarily in order to obtain the objective length $|x_a - x_b|$ in a unique manner? The existence of the process of measuring the length (the tips of a segment), which is independent of time and of the concept of simultaneity for the intrinsic frame of reference, proves a full independence of time and spatial characteristics in this system. But why for the other, moving system must arise any new additional link between the coordinates and time except the kinematic concept of velocity?

Wrong is Mandelshtam's [22] judgement, that there is no "real length," and his example with the angular measure of an object. The angular measure of an object depends not only on object's size, but also on the distance to it, that is, on two parameters. Therefore, this measure can be made unique only if one parameter – the distance to an object – is fixed. Incorrect is also Mandelshtam's statement, that in any method of measuring the lengths the rods moving in different manner have different lengths. For example, possible is the procedure of measurement (direct comparison) of the rods previously turned perpendicular to the relative motion of the rods. Then the rods can be turned in arbitrary manner. They could even be slowly rotating in order to occur to be perpendicular to the motion at the time of coincidence. In such a case this method is completely independent on the relative motion even in SRT. The SRT tries to "purchase" the consistency of its determination of lengths by refusal from the objectivity of some other physical quantities. However, this trick won't "work" with respect to the time – it is irreversible. Note some strange thing: in the sense of reversibility (in transition from one frame of reference to the other and back!) the linear Lorentz transformation are fully equivalent both for coordinates and for the time (they are reversible).

Let us make some comments concerning the Lorentz transformations. One of the approaches to deriving these transformations uses the light sphere, which is visible in different manner from two moving systems (the flash took place at the time of coincidence of the centers of systems). Or, what is actually the same, this approach uses the concept of interval (displaying the same sphere). The solution of the system of equations

$$x^2 + y^2 + z^2 = c^2t^2; \quad (1)$$

$$x_1^2 + y_1^2 + z_1^2 = c^2t_1^2 \quad (2)$$

represents simply the intersection of two surfaces and nothing more. Under the condition of $y = y_1, z = z_1$ these figures will be the surfaces of a sphere and of an ellipsoid of rotation with the distance vt between the centers of the figures. However, this is actually the other problem – the problem on two flashes: it is possible to find the centers of the given flashes for any time instant (i.e. to solve the reverse problem).

In the other approach to deriving the Lorentz transformations such a transformation is sought, which transfers equation (1) into equation (2). Obviously, for four variables such a transformation is not unique. First, the separate equating $y = y_1, z = z_1$ represents only one of possible hypotheses, as well as the requirement of linearity, mutual uniqueness, reversibility, etc. Second, any transformation of light surfaces does not determinate at all the transformation of volumes (in which the non-electromagnetic physical processes may occur). For example, the speed of sound does not depend on the motion of a source as well, but no global conclusions follow from this fact.

In any case, the Lorentz transformations in SRT physically describe two objects, rather than a single one. Let us separate, instead of a light sphere, one beam perpendicular to the mutual motion of systems K and K'. Let us block the path of a beam by installing

the long mirror at a great distance from sphere's center (along the line parallel to the line of mutual motion of systems). Then the observer situated at the center of system K will record the reflected signal after some time. Let the signal be completely absorbed. However, the other observer moving together with system K' will catch a signal, also after some time, at the other point of space (let the signal be absorbed too). If we take a "continuum" of systems with different mutual velocities, then the signal can be caught at any point of the straight line. Then where has the additional energy appeared from? May be this is SRT's perpetuum mobile of the first kind?

Now we shall make some general remarks. The whole SRT kinematics follows from the invariance of the interval $dr^2 - c^2dt^2 = inv$. However, we see that this expression is written for the empty space. In a medium the speed of light is non-constant, it can be anisotropic, and the light of non-arbitrary frequency can propagate in the given particular medium (remind the attenuation, absorption, reflection, dissipation). There is no sections of physics, where the properties of phenomena in vacuum would be automatically transferred to the phenomena in other media (for example, in liquids – hydrodynamic and other properties; in solid bodies – elastic, electrical and other properties). That is, they are not determined by the properties of the empty space. And only SRT pretends to a similar universal "cloning" of properties.

Generally speaking, the properties of light, which are intrinsically contradictory and mutually exclusive, are simply postulated. Therefore, wrong is Fock's [20] statement, that the light is a simpler phenomenon, than the rule. The classical time (or the time determined by an infinitely remote source at the middle perpendicular to the line of motion) possesses some important advantage: we know a priory that it is identical everywhere, and no calculations or discussions are required concerning the prehistory of the process or properties of the space. Actually, SRT uses the speed of light as one of measurement standards. Remind that in the classical kinematics there are two measurement standards: the length and time. Since the introduction of a standard is the definition, its properties are not subject to discussion [22]. As a result, everything, which is related with the light propagation, ceases to be a prerogative of experiment in SRT. And because all derivations in SRT are written only for the events – the light flashes, then SRT occurs to be logically inconsistent (to say nothing of the fact, that the "use" of properties of light in vacuum is profusely spread to all other phenomena).

The impossibility of existence of velocities $v > c$ in no way follows from SRT. And the addition, that this statement relates to the signal transmission rate only, is only artificial addition (because of existence of obvious counterexamples to the extended treatment). However, the notion of signal (information) remains insufficiently determinate even with a similar addition. For example, while receiving a signal from the flare of supernova, are we not sure that the same information "is contained" at the diametrically opposite distance from the supernova (that is, we know about it at velocity of $2c$)? Or this is not information? Therefore, SRT can only deal with the information on a material carrier of electromagnetic nature propagating in vacuum sequentially through all points of space from the signal source to a receiver.

Feynman in his book [16] says with sarcasm about the philosophers and about the dependence of results on the frame of reference, but he does not emphasize that, in spite of any "appareness," the subjects have real objective characteristics. For example, a man may seem to have a size of ant from the great distance, but this does not mean that he has really reduced (all instruments are used to be calibrated just under objective characteristics). The reasoning on a relativity of all quantities seems to be realistic, but (!) once the time in SRT became relative and the rate of interaction was supposed to be finite, the notion of relative quantity for spatially separated objects has become indefinite. (It depends on the path of connection, is not bound causally, depends on the system of observation, etc). The definition of all quantities with respect to "far stars" is senseless, since we can see a "never existing reality." For example, the Alpha-Centaur has been at this particular place and possessed such properties 4 years ago; the other stars have been the same as we see tens or hundreds years ago and the distant Galaxies – billions years ago. In such a case, relative to which should we determine the quantities? It is clear that the relative quantities can be determined only with respect to the <u>local</u> characteristics of space (the unique instantaneous causal bond).

Some important remark concerns the notion of relativity, which has even entered the name of the SRT theory. Contrary to Galileo's ideas on isolated systems, an interchange of light signals between systems is used in SRT. The notion of relativity has been worked up to nonsense in SRT and lost its physical sense: in fact, the system with several (as a rule, two) objects is singled out, and the whole remaining real Universe is eliminated. If such an abstraction can even be postulated in SRT, then, the more so as, one can simply postulate the independence of processes inside the separated system on the velocity of system motion relative to the "emptiness" which remained from the whole Universe. But, even in spite of such an abstraction, no "real" relative quantities will appear for bodies (such as $\mathbf{r}_{ij}$, $\mathbf{v}_{ij}$, etc.). Indeed, the response of body i to the attempt of changing its state is determined by the local characteristics: the state of a body i and the state of the fields at the given point of space. But the changes having occurred with body i will have an effect on the other bodies j only in some time intervals Δt_j. Thus, all changes of quantities should be determined relative to the local

place (or local characteristics). And these phenomena just represent manifestations of the Newtonian absolute space. The question, whether the separated direction and separated coordinate origin (either moving or resting) exist in this absolute space – is quite different question. In the abstract (model) theories this question can be postulated, for example, from the considerations of convenience of the theory; but for our unique real Universe it should be solved experimentally. The absolute time notion in the classical Newtonian physics was extremely clear as well. The time should be uniform and independent of any phenomena observed in a system. Exactly such a property is inherent in the time synchronized by an infinitely remote periodic source on a middle perpendicular. However, in SRT the time is not an independent quantity: it is associated with the state of motion of a system v and with the coordinates, for example, by the relation $c^2t^2 - r^2 = constant$. For uniform running of time the choice of the time reference point is arbitrary. For unified description of the phenomena and for comparability of the results the scales (units of measurement) should be identical for all systems. The time running uniformity automatically ensures the greatest simplicity of description of the phenomena and for the basis notion of time allows to introduce its standard definition.

Let us make some more methodical comments. Generally speaking, in SRT the method of comparison of the phenomena in two various inertial systems supposes, that both these systems have existed for infinitely long time. However, the systems have often been "linked" to particular bodies and have existed for a finite time only. Then, in each particular case the question needs to be studied: whether the prehistory of formation of these systems (its influence) has been "erased" or not?

The Euclidean analogies with projections in the book [21] are completely inadequate to the reality. The projection is only an abstract method of description, the subject itself does not change at turning. In SRT, on the contrary, the characteristics of an (even remote) object instantaneously change with changing the motion of an observer (!).

The limiting transition from the Lorentz transformations to the Galileo transformations (for the time $t = t' + vx'/c^2$) indicates that the Newtonian mechanics is not simply a limit of low velocities $\beta = v/c \ll 1$, but the other condition is required, namely: $c \to \infty$. But in this case for many quantities in SRT there is no limiting transitions to classical quantities [29].

The property of maximum homogeneity of the space-time can be an attribute of either ideal Newtonian mathematical space and time (being actually a "superstructure from above"), or of the model space (for example, with remotely non-interacting material points). The attempt to rest upon the mentioned property in RT as on the principal property of the real space and time is artificial. First, even in the earth scales we can not arbitrarily change the points of space, time instants, directions of axes and velocities of inertial systems (recall the limited nature of the Earth space, the rotation of the Earth, the gravitational field, the effect of the Moon, the electric, magnetic, temperature fields and so on). We have listed above the real achieved practical limitations, rather than the principal restrictions somewhere at relativistic velocities and huge scales of the Universe. True, in the scales of the Universe with its real objects and gravitational fields this property is not confirmed too: the model of uniform "jelly" does not describe the real Universe. Second, in addition to the form of equations, the solution is still determined mathematically by the boundary and initial conditions. This also actually, on real finite scales, prevents any shifts and changes (or it is necessary to change, in addition, the imposed conditions). How can we approach the existing nonlinear properties and equations with the RT claims? Even the "relativity" notion itself does not allow us to generalize (more likely, to narrow down) the real space with gravity. (As Fock [20] has emphasized, the "general relativity theory" term is inadequate).

The principle of relativity (in any form) supposes that "without looking" outside the limits of a system it is impossible to discover its uniform motion. Earlier it was the ether, which has played a part of the all-penetrating medium for possible discovering such a motion. Note that the question was not about the discovery of the absolute motion, but only about the motion relative to ether. That is, it would be possible to compare these motions "without looking" outside. But even with "canceling" the ether, according to the modern concepts, still remains the "candidate" with similar properties – the gravitational field (which is principally non-shielded). For example, from the relic radiation anisotropy, under the additional hypothesis on the equality of the rate of propagation of gravitational interactions and speed of light, may follow the anisotropy of the (all-penetrating) gravitational field. Thus, the non-equal rights of inertial systems in macroscales can be found, in principle, "without looking" outside even at the local point. This can be avoided theoretically under the hypothesis, that the rate of propagation of gravitational interactions is much higher than the speed of light; in such a case the isotropy could be set up.

3. Conclusion

The given paper is basically devoted to general physical issues and to the criticism of the relativistic kinematics. The presence of logical contradictions brings "to nothing" any results of any theory, and SRT is not an exception in this respect. In the present paper the critical remarks are given with respect to the relativistic concept of time, and a new logical SRT contradiction – the para-

dox of antipodes – is presented. Further, for numerous examples the inconsistency of the relativistic concept of length is demonstrated. (These examples include: the belt-driven transmission, the indefiniteness of the direction of contraction, a loop with current, etc.). The SRT contradictions for the problems of rod slipping over a plane and of flying rod turning are considered in detail. The true sense of the Lorentz transformations and of the interval invariance is discussed. Then the author critically discusses in detail the hyperbolization property of the "relative quantity" concept itself and the space-time homogeneity properties.

The resulting conclusion of the paper consists in the necessity of returning to the classical kinematic concepts (space, time, velocity, etc.).

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Spacetime & Substance, Vol. 4 (2003), No. 3 (18), pp. 123–135
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PRINCIPLES OF NEW PHYSICS, ASTROPHYSICS AND MATHEMATICS

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Received July 15, 2003

The opportunity to describe the basic units of measurements (physics) in constants h and c is obtained as the solution result of "a time problem." The new quantum-mechanical effect of mass-oscillations of particles is predicted. Substantiations of postulates about $h = const$ and $c = const$ are resulted. A full line of stable fermions (known and expected) and a full line of interactions kinds corresponding to them (also known and expected) are obtained. The opportunity of the problem solution of the mass nature is shown. Preconditions of a physical substantiation of mathematics (physmathematics) are obtained. The substantiation of a charging skewness of the universe ("substance"-"antisubstance"), and also its large-scale isotropy is resulted.

1. Introduction

It is known, that with the help of three basic units of measurements (weight, time and lengths) can describe all physics (nature).

Here is how the modern science defines these primary concepts:

"The mass nature is a question of number 1 in modern physics." [1]

"Einstein believed that the time orientation and time is illusion — the time orientation arises when we introduce artificially the time in the untimely universe." [2]

The length parameter of trajectory in quantum physics at all has no sense in classical understanding.

Hence, the basic physical concepts with which help the all physics, finally, is formed, a high degree of uncertainty differ.

Therefore the problem to formulate physics in strictly fixed universal, fundamental Planck constants $h\left[\frac{g\cdot m^2}{s}\right]$ and light speed $c\left[\frac{m}{s}\right]$ appeared actually.

However this problem cannot be solved by traditional methods because the dimensional discrepancies exist, as any combinations h and c do not give to obtain the dimensions of weight, time and lengths.

This problem is solved with the help of not trivial, but the consistent principle of equivalence of time and mass

$$t = m_t\,. \tag{1}$$

And then in units of h and c the basic units will become

$$m = \frac{\sqrt{h}}{c}\cdot\left(\sqrt{1-\beta^2}\right)^{-1}; \tag{2}$$

$$t = \frac{\sqrt{h}}{c}\left(\sqrt{1-\beta^2}\right)^{-1}; \tag{3}$$

$$r = \sqrt{h}\cdot\left(\sqrt{1-\beta^2}\right). \tag{4}$$

Consistency of the principle (1) follows from the experimental fact that there are no real hours which would work, not spending mass-energy (sand, water hours) or energy-mass (mechanical, electric, nuclear hours).

"Eternal" hours do not exist just as there is no "eternal" engine.

Acceptance of the principle (1) is caused by invariance of expressions (2) and (3); it experimentally proves in accelerators at movement in them short-lived particles. The mass and time of their life invariantly changes depending on speed.

Introduction of the principle (1) results in necessity, except for existing mass, for example: inertial, gravitational, relativistic, resulted, etc. to introduce the time mass m_t.

Let's consider the following example.

Let a sand-glass are adjusted so, that for traditional second in them one gramme of sand flows

$$(t = m_t) = (1s = 1g)\,. \tag{5}$$

In this case it is impossible to prove preferability of one of the following two statements:

a) The train goes with a speed of 5 m/s (expired),

b) The train goes with a speed 5 m/g (expired).

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These statements are identical since in a sand-glass the mass-energy of sand and anything else (as well as in other kinds of real hours) flows only. In this connection Newton's second law

$$F = m \cdot \frac{d^2x}{dt^2} \tag{6}$$

in view of the principle (1) will become

$$F = m \cdot \frac{d^2x}{dm_t^2}. \tag{7}$$

Expressions (6) and (7) are equivalent.

Applicability of the principle (1) to the Newton's second law means its applicability to all classical physics.

This principle is also applicable without an inconsistency to the equations of Maxwell, Dirac, Einstein, Schroedinger and to all physics.

The paradoxical situation has arisen in practical metrology. If for the mass and length the materialized samples (standards) among the basic units of measurements, accordingly the mass of 1 kg and a core of 1 m exist, for the time the materialized standard, i.e. the sample of 1 second does not exist. It is impossible to make 1 second as the material standard, i.e. a sample (it is similar to the mass and rod) [24].

Whether is in this connection "time" a synonym "teplorod," "phlogiston" from thermodynamics?

In practical metrology the devices which work using of quantum-relativistic effects which are determined by constants h and c are applied for reception of exact values of the basic weights and measures whereas it is impossible to formulate theoretically the basic units of measurements in h and c by existing methods because of dimensional reasons.

Above mentioned contradictions are eliminated by a consistent principle $t = m_t$ and by the consequences following from it.

2. About the choice of classical weights and measures

It is known, that the choice of existing weights and measures (including the basic SI and CQS) is carried out any way from subjective reasons of convenience of their application. The kg, meter, second, gramme, centimeter, inch, ton, kilometer, carat, mile, pound, etc. how many exists tribes and peoples, is as much used subjective weights and measures.

If the nature was so prodigal in a choice of weights and measures, it simply would not take place.

Therefore the opportunity to formulate all any (subjective) weights and measures (physics) in units of h and c following of the principle (1) excludes an existing arbitrariness, allowing to turn physics on a natural language of the nature in constants h and c.

Peculiar standardization of physics in units of h and c is carried out.

Only the consistent principle (1) allows realizing such opportunity without infringement of dimensions and without contradictions.

It is known, that in classical systems of units the mass, length and time among themselves are not connected, whereas the units (2), (3), (4) received from the principle (1) in h and c are rigidly connected among themselves by the light speed as (in not relativistic form):

$$\frac{r}{t = m_t} = c = \text{const}. \tag{8}$$

As (2), (3), (4) are expressed in h and c they are directly applied to quantum objects (elementary particles) which are determined by these constants since in the quantum world quantum hours are quantum objects. Hence, the choice of classical (subjective) units (including CQS and SI) should be made by acceptance as the standard (sample) of quantum object in which the parity-criterion (8) is observed instead of any (subjective) classical standards (weights, rods, etc.) in which the criterion (8) is not observed.

Let's consider as the quantum etalon (sample) the most investigated proton with following parameters:

$$m_p = 1.67 \cdot 10^{-24}\ g; \tag{9}$$

$$r_p = 0.48 \cdot 10^{-13}\ cm \tag{10}$$

(value (10) is determined by radius of the complete potential of JAmada-Johnston for all states of interacting nucleons [3]).

From the principle (1) the own mass of observed object should be considered as own time-mass in sense Einstein-Prigozhin as the proton is quantum object it should correspond to criterion (8)

$$\frac{r_p}{t_p = m_p} = c. \tag{11}$$

Value (11), with the account (9), (10), taken in CQS (up to 2 sign), gives:

$$\frac{0.48 \cdot 10^{-13}\ cm}{1.67 \cdot 10^{-24}\,(s = g_t)} = 2.87 \cdot 10^{10} \frac{cm}{s = g_t} \tag{12}$$

that on $\sim 4\%$ it is not correspond with experimental value of light speed $3.00 \cdot 10^{10}\ cm/s$.

Application to (11) values (9), (10), taken in SI gives:

$$\frac{0.48 \cdot 10^{-15} m}{1.67 \cdot 10^{-27}\,(s = kg_t)} = 2.87 \cdot 10^{11} \frac{m}{s = kg_t} =$$

$$= 2.87 \cdot 10^{13} \frac{cm}{s = kg_t}, \tag{13}$$

that on 3 order it is not correspond with experimental value of light speed.

Difference of values (12) and (13) is determined by that at the arbitrary establishment of unities CQS and a SI difference of masses in them is spotted 10^3 time ($kg = 10^3\ g$), whereas duration ("time") in CQS and the SI are maintained identical ("seconds").

If at the arbitrary establishment of unities CQS and the SI of a mass unit and time varied proportionally (gramme, second in CQS and kilogramme, a kilosecond in a SI) values (12) and (13) would be equal.

From the principle $t = m_t$ follows, that the hierarchy of duration ("times") should be observed as much as hierarchy of masses-energies.

From result (12) follows, that system CQS with precision $\sim 4\%$ ensures correspondence to criterion (11) that is represented sufficient for the further analysis of a considered problem in CQS.

More precise coordination CQS with criterion (11) is ensured with increase of a mass unit in CQS from 1 gramme up to 1.04 gramme, it corresponds to 1 gramme then the mass of a proton in the formula (12) will vary with $1.67 \cdot 10^{-24}\ g$ up to $1.6 \cdot 10^{-24}\ g'$, it will give in the formula (12) value $c = 3 \cdot 10^{10}\ \frac{cm}{s = g'_t}$ equal to experimental value of light speed.

Hence, according to criterion (11) etalon of mass (Sevr, France) should be enlarged by $\sim 4\%$.

If casual coordination CQS with criterion (11) was less precise, it would be necessary arbitrarily (as CQS and a SI) to generate the new force system adequate by criterion (11).

From above mentioned backgrounds and the principle (1) follows, that the spatial structure (size) of an electron should be exhibited on length

$$r_e = (m_e = t_e) \cdot c = 2.7 \cdot 10^{-17}\ cm \tag{14}$$

(experience on length $\sim 10^{-16} cm$ have shown, that the electron has performances of a point).

Elementary particles should have new expected quantum mechanical effect of change (oscillation) of values of their rest masses (mass-oscillations)

$$\nu_{m_x} = (m_x = t_{m_x})^{-1} \tag{15}$$

that, for example, for a proton and an electron should make accordingly $\sim 10^{24} Hz$ and $\sim 10^{27} Hz$. For a proton this new effect can be tested in experiments already now.

I. Prigozhin: "whether the quantum mechanics of the complete is? I think that more than it is enough arguments for the sure negative answer." [4].

As the parameter of mass is one of the major the confirmation of effect of mass-oscillations of particles in experiments could become essential addition of a quantum mechanics, create backgrounds for clearing up of how mass-oscillations of particles are exhibited in quantum effects. For example, shaping of the diffraction patterns of a dispersion of particles, in "zero" oscillations and energies, in resonant and virtual effects, in interpretation of undular and probability properties of a microcosm, in making backgrounds for the substantiation of belief Einstein, Dirac and other investigators in "return to a causality," but on qualitatively new basis.

New theoretical dependence for a stationary value of a weak coupling to within 6–7 signs is obtained:

$$\sigma_{feeble} = m_e^2 \cdot c^3 \cdot h = 1.5 \cdot 10^{-49}\ erg \cdot cm^3. \tag{16}$$

Experiment gives precision up to 2-3 signs.

Known Planck mass

$$m_\gamma = \left(\frac{hc}{\gamma}\right)^{1/2} = 10^{-5}\ g \tag{17}$$

is improved from the principle (1) up to value

$$m_\gamma = \left(\frac{h\gamma}{c^5}\right)^{1/2} = 10^{-43}\ g. \tag{18}$$

Preferability of mass (18) before (17) that huge on gauges of a microcosm the mass (17) in experiments was not observed, and absence of it can be justified by the actual small value (18) obtained from $t = m_t$.

3. The substantiation of the postulate about the light speed is the limiting

It is known, that a postulate underlying in the basis of a relativity theory about the light speed is limiting has no substantiations.

Last circumstance called major doubts at itself Einstein which is the author of this postulate.

Here is how Einstein estimated this problem: "I do not believe, that the god has created the Universe such, that in it light speed on anything does not depend." [5].

From the principle (1) backgrounds of the substantiation of a postulate about a constancy of light speed can be obtained.

Let's show it.

Let's consider the arbitrary object in mass m_x and the size R_x, Fig. 1.

Obviously, that the size R_x does not reflect (does not comprise) all mass of object m_x. R_x reflects only that part of object where it is directly marked.

However the object can be presented as a chain, for example, protons, Fig. 1b, (component other particles also can be taken into account) and then to within parameters of a proton the size of a chain R_{x-full} will contain all mass m_x.

From the principle $t = m_t$ for any object of the nature, Fig. 1, the expression

$$(m_x = t_x) \cdot c = R_{x-full} \tag{19}$$

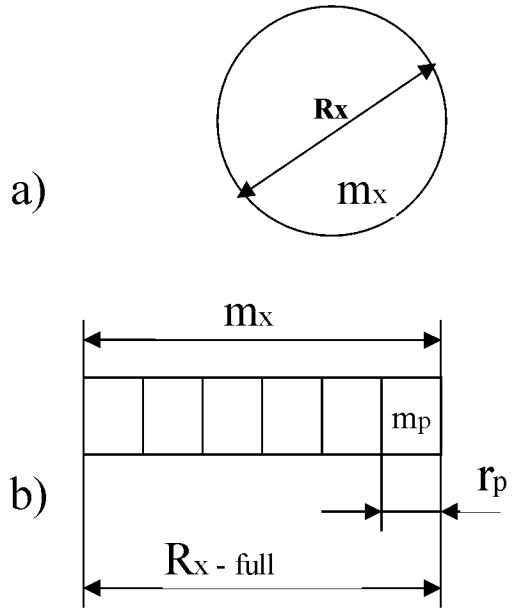

Figure 1: Finding of the complete size of macroobject $R_{x-full} = (m_x = t_x) \cdot c = \frac{m_x}{m_p} r_p$.

is correspond with classical value for Fig. 1b as:

$$\frac{m_x}{m_p} \cdot r_p = R_{x-full}, \tag{20}$$

in this connection from (19) we shall receive relevant to criterion (8) value

$$c = \frac{R_{x-full}}{m_x = t_x} = \text{const}, \tag{21}$$

it is shown on Fig. 2. From the given figure it is visible, that on all "floors" of the nature (a microcosm, a macrocosm, the megaworld) the formula (21) is the exact.

For a microcosm $R_{x=full}$ and really observe size of object (particle) is same since in the quantum world the quantum clocks is the quantum objects. For a macro- and megaobjects $R_{x=full}$ is meaningful as equivalent expressions (19) and (20).

The fact of dependence of the planets sizes of solar system and the Sun from their masses, (Fig. 3) is explained by above mentioned estimations. This peculiar "echo," a corollary of the Big Bang in which beginning all objects of the nature were in a quantum state and directly agreed with the principle $t = m_t$, precisely placing on the characteristic curve Fig. 2. Other satisfactory explanation of this fact for today does not exist.

Hence, the deepest Einstein's intuition appeared justified and this time that the light speed should depend on something. It really depends on parameters of observed objects as a relation (21) following from the principle $t = m_t$, no contradiction applicable on all "floors" of the nature, (Fig. 2).

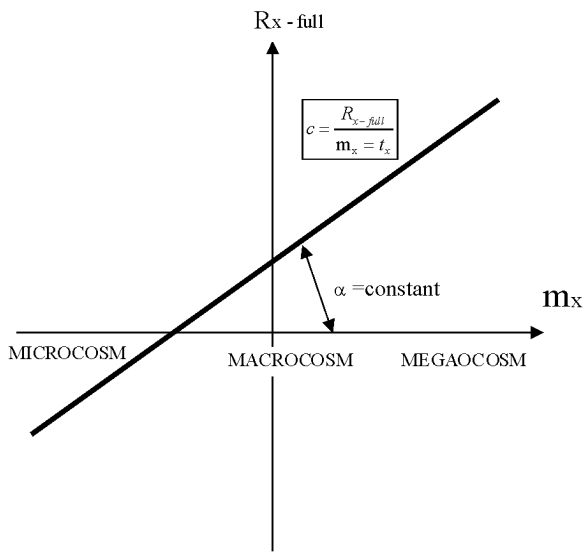

Figure 2: A substantiation of a postulate about the light velocity is constant on all "floors" of the nature (a microcosm, a macrocosm, the megaworld) as $c = \frac{R_{x-full}}{m_{x=t_m}} = \text{const}$.

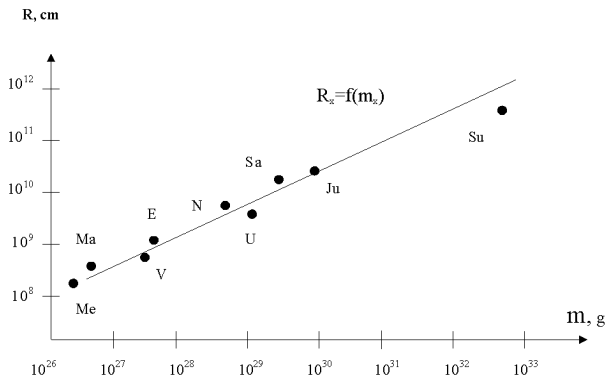

Figure 3: Dependence of the observable sizes of planets of solar system and the Sun on their weights. Designations: Me — Mercury, Mr — Mars, V — Venus, E — the Earth, N — the Neptune, U — Uranus, St — Saturn, J — the Jove, S — the Sun. (Parameters of Pluto are not resulted in view of their low reliability).

In the formula (19) copied as

$$(m_x = t_x) \cdot (v_x \leq c) = R'_{x-full},$$

velocity values $v_x \leq c$ determine the shape (strain) of object on fig. 1.

4. The substantiation of the postulate about the quantum of action is the limiting

It is known, that the majority of founders of a quantum mechanics were not satisfied its final wording. We shall give some estimation, [6].

E. Shredinger: "The quantum pattern of the material reality which exists is shaky and doubtful, as it was never ".

M. GellMann: "The quantum mechanics is the complete of riddles and paradoxes discipline which we do not understand up to the extremity."

P. Dirak: "The relativistic quantum theory as the base of the modern science is not suit anywhere ".

R. Fejnman: "I am convinced that nobody understands a quantum mechanics."

Also it is the point of view of scientists which have received Nobel Prizes for development of bases of a quantum mechanics.

The reason of such severe dissatisfaction ("cry from the heart") will be, that the postulate underlying a quantum mechanics about the quantum of action is limited (M.Plank, 1900) has no substantiations.

Let's show an opportunity of such substantiation from the principle $t = m_t$.

From this principle in work [6] the complete series of known and expected stable fermions, almost on 100 % determining structure of the nature is obtained:

$$m_{min} < m_\gamma < m_v < m_e < m_p < \Delta m_o \tag{22}$$

or in grammes

$$10^{-104} < 10^{-43} < 10^{-32} < 10^{-27} < \\ < 1.7 \cdot 10^{-24} < 2.7 \cdot 10^{-24}, \tag{23}$$

where m_v , m_e , m_p are known stable fermions of a neutrino, an electron, a proton;

m_{min} , m_γ , Δm_o are expected stable fermions accordingly: minimal, a gravitino (new Planck's mass $\sim 10^{-43}$ g), a maximum stable fermion.

Some other parameters of particles of a series (22), (23) are given below:

spatial structure (sizes), cm:

$$R_x = (t = m_t) \cdot c, \tag{24}$$

$$10^{-94} < 10^{-33} < 10^{-22} < 10^{-17} < \\ < 5 \cdot 10^{-14} < 8 \cdot 10^{-14}, \tag{25}$$

frequency of mass-oscillations, Hz:

$$\nu_{m_x} = (m_x = t_x)^{-1} \tag{26}$$

$$10^{104} > 10^{43} > 10^{32} > 10^{27} > 6 \cdot 10^{23} > 4 \cdot 10^{23}, \tag{27}$$

the typical energies, in ergs

$$E_{typical} = v_{m_x} \cdot h, \tag{28}$$

$$10^{78} > 10^{17} > 10^{5} > 10^{0} > 3.9 \cdot 10^{-3} > 2.4 \cdot 10^{-3}; \tag{29}$$

Quantity of stable fermions expected in the nature, item:

$$n_x = \frac{E_{universe}}{E_{typical}}, \tag{30}$$

$$1 < 10^{61} < 10^{72} < 10^{77} < 1.7 \cdot 10^{80} < 2.7 \cdot 10^{80}. \tag{31}$$

The complete series of kind interactions α_x typical for the complete series of stable fermions (22), (23), in units of the strong also is obtained (known and expected),

$$\alpha_x = 10^{-52} < 10^{-39} < 10^{-26} < 10^{-13} < \\ < 10^{0} < 10^{13}, \tag{32}$$

where known: 10^0 is strong; 10^{-13} is feeble; 10^{-39} is gravitational; expected kinds of interactions: 10^{-26} is the intermediate (neutrino); 10^{-52} is minimal (under gravitational); 10^{13} is superstrong.

In this connection, the following information is of interest. "In fundamental physics the revolution was accomplished. Experiment with a neutrino has shown that the diversion of behaviour of this particle has made 1% from theoretical calculations. During a series of experiment in the most high-power in the world the accelerator of particles, laboratories Fermi (Chicago) diversions from standards model have so stroked scientists that at the moment of deriving result anybody could not utter a word. Roughly speaking, "tricks" of a neutrino can mean that on a particle acts unknown, till now, exterior force or unknown particles The physicists of the USA, Japan and Europe hope to find out in a following series of experiments what it are particles." [23].

Such behaviour of a neutrino can be determined by the mentioned above new expected kind of interaction (neutrino) with intensity $\sim 10^{-26}$ of unities of the strong, which the author predicted in 1992 in his work [6].

The electromagnetic interaction is considered as component of Vajnberg-Salam's electrofeeble with intensity 10^{-13} of unities of the strong.

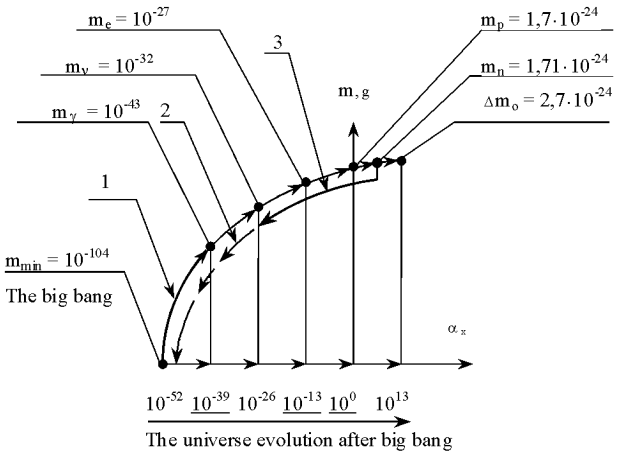

Figure 4: Dependence of mass m_x of full lines of the stable fermions known and expected, on kinds of the interactions α_x corresponding to them, known (is underlined) and expected. Designations: 1 - development ("the Big Bang") the universe from m_{min} up to Δm_0; 2 - full (expected) disintegration of a neutron $m_n = m_p + m_e + m_{\bar{\nu}} + m_\gamma + m_{min}$; 3 - classical (observable) disintegration of a neutron $m_n = m_p + m_e + m_{\bar{\nu}}$.

Analytical dependence of mass values of the complete lines of stable fermions (22), (23) from kinds of interactions (32) will be spotted as

$$m_x = \Delta\alpha_x^{y_m}, \tag{33}$$

where

$$\Delta\alpha_x = \frac{\alpha_{x+1}}{\alpha_x} = 10^{-13} \tag{34}$$

from lines (32).

Finally (33) will become

$$m_x = 10^{-13 y_m}, \tag{35}$$

where

$$y_m = 1.81;\ 1.83;\ 2.1;\ 2.5;\ 3.3;\ 8. \tag{36}$$

The obtained dependence (35) is given on Fig. 4.

Densities of the complete lines of stable fermions (22), (23) also will make a series g/cm^3:

$$10^{176} > 10^{54} > 10^{31} > 10^{22} > 10^{16} > 10^{15}. \tag{37}$$

Let's allocate parameters of the first term m_{min} of the complete lines of stable fermions (22), (23): mass $m_{min} = 10^{-104}\ g$; the size $r_{min} = 10^{-94}\ cm$; density $\rho_{max} = 10^{176}\ g/cm^3$; frequency of mass-oscillations $\nu_{m_{min}} = 10^{104}\ Hz$; the typical energy $E_{typical \cdot m_{min}} = h \cdot \nu_{m_{min}} = 10^{78}\ erg = E_{universe}$; the quantity of particles m_{min} under the formula (31) is equal 1.

From the given parameters follows, that the particle m_{min} is in a singular, being the Universe in a state of a singularity, which (particle) with frequency $10^{104}\ Hz$ and the typical energy $E_{typical \cdot m_{min}} = E_{universe} = 10^{78}\ erg$ mass-oscillates, radiates, "duplicates" in quantum h and with light speed c the observed Universe on all its "floors." It is the peculiar particle a supergene, which is "the nature of all" = "all" = peculiar "the physical God" = "the reason of all," including the substantiation of why the Planck's constant h and light speed c are fundamental, universal, constant as parameters of this particle (supergene) satisfy to criterion (8):

$$\frac{r_{min}}{m_{min} = t_{min}} = \frac{10^{-94}}{10^{-104}} = c = \text{const}.$$

With increase of resolving ability of telescopes the activity of observed objects should increase (quasars, aggregations of quasars, etc.) up to values when peculiar "a continuous fire" = a particle "supergene" m_{min} = the Universe in a state of a singularity will be observed.

Let's give arguments for the benefit of that relict radiation also is an indication of new, expected minimal interaction by intensity about 10^{-52} unities of the strong:

1) relict radiation is a corollary of "The Big Bang";

2) "The Big Bang" is determined by necessity of existence minimal on mass of a stable fermion $m_{min} = 10^{-104}\ g$ (a particle = "supergene");

3) for this stable fermion ("supergene") the interaction with intensity about 10^{-52} unities of the strong, formulas [22] ... [36] is typical.

On Fig. 5 the dynamics of other expected property of a particle (supergene) m_{min} of macroscopic effect of mass-oscillations with amplitude on mass $\pm 10^{57}\ g$ (the expected mass of the Universe) and the period $\geq 10^{32}$ of years is given.

In points 0, 2, 4 Fig. 5 the particle (supergene) m_{min} (Universe) is in a state with maximum value of a kinetic energy of the order $10^{78}\ erg$ and with the minimal ("initial") mass of the order $10^{-104}\ g$. As the analysis has shown, in these critical points prolongation of development of the Universe in a direction of change of its charging state in coordinates "substance — antimatter" is the most energy favorable, than the observed skewness in the nature becomes clear. At the given stage of development the Universe is in a phase "substance" (a point "$+m_p$" on ordinate fig. 5).

In points 1, 3 Fig. 5 the Universe is in a state of maximum value of a potential energy as a rest mass of the order $10^{57}\ g$ and the minimal kinetic energy (stationary state).

The shown dynamics of development of the Universe is applicable in case to consider the Universe as quantum object at all stages of its development. The current state of the Universe also is close to a quantum state as, for example, its observed radius is close to value of

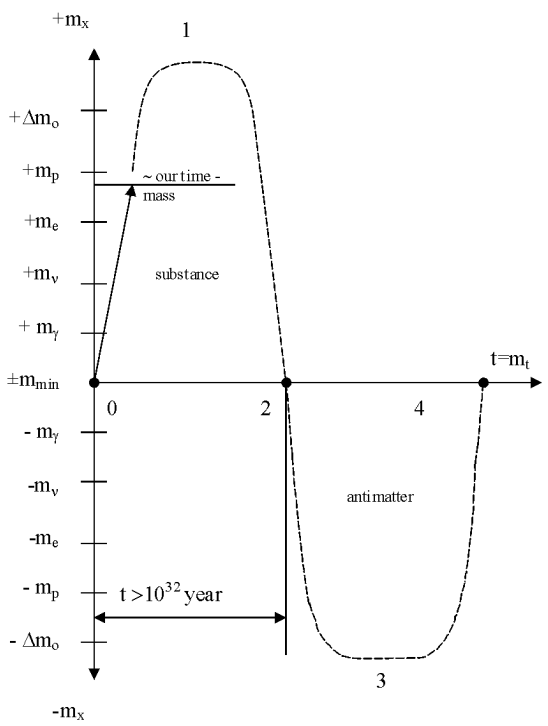

Figure 5: A substantiation of the phenomenon (fact) of charging asymmetry of the universe its mass-oscillations in coordinates "substance-antimatter" with amplitude $\pm m \approx 10^{57}$ g and the period $\geq 10^{32}$ of years.

SHvartsshild's radius describing the Universe as quantum object ("a black hole"):

$$R_{ObservableUniverse} = R_{Shv.un.} = \frac{2\gamma m_{un}}{c^2} \approx 10^{28}\ cm.$$

The Universe density and SHvartsshild's density for the observed Universe also are close.

5. About the nature of mass

As the mass is the major physical property the definition of its nature represents big interest. Let's show how the state of this problem is estimated in the encyclopedic guide "Physics of a microcosm."

"... the nature of mass is one of the major unsolved problems of a modern physics. ... the theory explaining why masses of fundamental particles form a discrete spectrum of values and allow to spot this spectrum also does not exist." [7].

Above mentioned definition from [7] we shall consider as three problems.

a) Definition of "nature" of mass.

Definition of "nature" of any object, appearance means an opportunity to express this object, appearance through units of measure.

So, the Newton's mass is determined as

$$m_0 = \{m_0\}\,[m_0] \tag{38}$$

where $\{m_0\}$ is a pure number, $[m_0]$ is a dimension (g, kg, ...).

From the formula (38) follows, that the mass m_o "consist" of mass units $[m_o]$.

From the principle $t = m_t$ "nature" (dimension) of mass is determined as,

$$m_0 = \{m_0\} \cdot \left[\frac{\sqrt{h}}{c}\right] \tag{39}$$

that is the mass m_o "consist" of h and c as $\left[\frac{\sqrt{h}}{c}\right]$.

Particles decay only on γ quantum (for example, electron-positron pairs) at an annihilation and energies below energies of formation of new particles can be an indication of simplicity of these particles "consisting" only from γ quantum, not having rest masses and determined stationary values h and c ("consisting" of h and c).

b) The second part of a problem of "nature" of mass (why masses form a discrete spectrum) is determined by new interpretation of "nature" of mass in terms of h and c, the formula (39) where presence of a Planck constant h determines a discrete spectrum of mass values of fundamental particles. (Newton's classical (38) and the relativistic (40) masses have no such indication).

c) Definition backgrounds of a mass spectrums of particles are shown in previous section 4 as values of masses of the complete lines of stable fermions (known and expected) as function of kinds of interactions (also known and expected), the formula (35).

As fermions are primary (from fermions can be obtained both fermions and bosons) that definition of a spectrum of masses of the complete lines of stable fermions (almost on 100 % defining structure of the nature) can create backgrounds for definition of masses of unstable fermions (as states stable) and bosons (as carriers of known and expected kinds of interactions, a series 32, Fig. 4).

Let's mark a corollary which streams from new interpretation of the mass nature in terms of h and c .

Classical expression of mass (38) in the relativistic shape

$$m_v = \frac{\{m_0\}\ [m_0]}{\sqrt{1-\beta^2}} \tag{40}$$

can be noted as

$$m_v = \frac{\{m_0\}}{\sqrt{1-\beta^2}} \cdot [m_0] \tag{41}$$

or

$$m_v = \{m_0\} \cdot \frac{[m_0]}{\sqrt{1-\beta^2}}. \tag{42}$$

Expressions (41), (42) are equivalent as in a case (41) change of mass m_v happens due to change of the

dimensionless component (numbers) $\{m_o\}$, and in a case (42) due to change of dimension $[m_o]$, for example $[g] \to [kg]$.

Qualitatively other physical sense in an estimation of mass in terms of h and c is given the formula (39).

Let's copy the formula (39) as:

$$m_v = \frac{\{m_0\}}{\sqrt{1-\beta^2}} \cdot \left[\sqrt{h}\Big/c\right] \tag{43}$$

or

$$m_v = \{m_0\} \cdot \frac{\left[\sqrt{h}\Big/c\right]}{\sqrt{1-\beta^2}}, \tag{44}$$

where formulas (43) and (44) are not equivalent as if in a case (43) change of mass m_v happens due to change of the dimensionless component (numbers) $\{m_o\}$ expression (44) is physically deprived sense in a view of a constancy of expression (dimension) $\left[\sqrt{h}\Big/c\right]$. From (43) and (44) the deduction follows: with change of velocity of a motion of particles (in accelerators), change of their masses happens due to change of their number ("entrainment" of vacuum particles), but not due to change of mass (dimension, "nature") the particle.

Such corollary does not stream from classical formulas (41) and (42).

From expressions (43), (44) also follows, that physical sense, dimension, the nature of mass as

$$\left[\sqrt{h}\Big/c\right] = 2.7 \cdot 10^{-24}\ g \tag{45}$$

is universal, fundamental, in the same measure in what its component the stationary values h and c are universal, fundamental. In the complete series of stable fermions (22), (23) maximum on mass the stable fermion Δm_o (last term of lines) has the mass equal (45), that indicates that all remaining terms of the complete lines of stable fermions (22), (23), smaller on masses, is varieties (state) fundamental (45)

$$\Delta m_o = \left[\sqrt{h}\Big/c\right] = 2.7 \cdot 10^{-24}\ g, \tag{46}$$

including a particle a supergene m_{min} (the Universe in a state of a singularity).

"States" of fundamental mass (46) as masses of the complete lines of stable fermions (22), (23) are determined by kinds of interactions under the formula (35) and Fig. 4.

It can create backgrounds for an explanation of course nature of Redzhe's trajectories and the substantiation of CHju and Frauchi "lacing" idea in according to which all hadrons are equally fundamental also all of them "composed" from all remaining hadrons. [3].

There are arguments for the benefit of that the nearest candidate for a role of an expected maximum stable fermion (46) is the unstable neutron, Fig. 4 which will transfer in a state of a stable particle (46), [6] in the evolution process ("expansions") of the Universe.

In connection with enunciated above, a classical decomposition reaction of a neutron (β decay)

$$m_n = m_p + m_e + m_{\overline{\nu}} \tag{47}$$

according to a series (22), (23) and Fig. 4, should look like

$$m_n = m_p + m_e + m_{\overline{\nu}} + m_\gamma + m_{min}, \tag{48}$$

where the first three terms of the formula (48) are known stable fermions of series (22), (23), Fig. 4 proton, an electron and a neutrino; last two terms of the formula (48) are expected stable fermions of series (22), (23), fig. 4: $m_\gamma = 10^{-43}\ g$ is a gravitino, $m_{min} = 10^{-104}\ g$ is a particle "supergene."

Values m_γ, m_{min} so are small that there are far from the experimental opportunities of their recording.

But it should not confuse. In 1930 V.Pauli has assumed existence of a neutrino which in experiments has been confirmed only approximately 26 years later.

Mass-oscillations of particles and reactions of decomposition-synthesis under the formula (48) and Fig. 4 (pointers along a curve from m_{min} up to m_n a neutron and back) ensure the constantly acting connection on all "floors" and between all "floors" of the nature, the parameters observance of the Universe in limits of the SHvartsshild's equations is ensured in the circumstances and as the corollary, its large-scale isotropy (effect of "smoothing of densities") is maintained.

The indicated reactions (including the virtual) ensure a continuous connection, the information between m_{min} (the Universe in a state of a singularity, The Big Bang) and "present situation," states of the Universe are determined by kinds ("floors") of interactions (Fig. 4, an abscissa α_x).

V.L. Ginzburg: "... already primely it is impossible to find the any informed physicist who would not see incompleteness and lack of a closure of the fundamental theory..., new physics, undoubtedly, is necessary both in physics and in astronomy" [8].

Above mentioned results create backgrounds for the solution of the formulated program.

6. The substantiation of the physical nature of mathematics (physmathematics)

A. Ejnshtejn, M. Born, B. Riman, D. Strajk, A. Puankare, D. Gilbert and other researchers indicated an urgency of the physical substantiation of mathematics. [6].

P. Betru: "If the mathematics is almost precisely compounded with empirical requirements it is result

not its internal properties, and only exterior circumstances." [9].

E. Vigner: "We cannot know the bases on which mathematical formulas are compounded with the physical world." [10].

L. Kolmar: "I guess that investigation of a problem of the empirical substantiation of mathematics will be one of the basic directions in the future, if not basic." [11].

B. Riman: "... the geometry is not something the god give, the absolute, but there is a part of physics." [12].

On definition of the Major Soviet encyclopedia "the point is one of the basic and initial concepts of geometry." The contradiction is that such dimensional geometrical fashion as line, the area, volume, etc., all dimensional geometry are shaped of concept of "the dimensionless point."

As it was indicated earlier, the principle $t = m_t$ gives in change of dimension of some physical quantities that does not contradict following estimation:

"... us accustom to view the nature in various aspects with the help of such quantities, as mass, energy, force, impulse, electrical charge, etc. It is necessary to understand firmly, that everything, which finally we measure in scientific experiments, is lengths of spatial and gaps of time intervals. We gain values of all other physical quantities only from results of these last results." [13].

Above mentioned definition reflects essence of the existential concept of the GR. The principle (1) allows to deepen these representations up to an opportunity to express and space-time also in terms of h and c.

So, with the account $t = m_t$ the Planck's constant $h\left[g \cdot cm^2/c\right]$ will find the dimension $h\left[cm^2\right]$, the relevant unit area. By virtue of the universal fundamentality of quantity h it in new interpretation can be considered as physical sense, a physical analog (dimension) of a geometrical point or its analytical equivalent i.e. unity, Fig. 6.

The geometrical point which "has no the sizes," and a line which on definition "has length, but has no breadth," cannot have physical sense as also a point "without the sizes," and length "without breadth" to reflect, radiate, and immerse the energy cannot. Hence, they cannot be a subject of physical measuring.

The physical sense can have as a minimum only the area. Therefore the physical sense of a point should be determined by some fixed universal fundamental unit area, such unity is the Planck's constant in new interpretation. Parameters, shapes of such physical point i.e. unity is determined by especially physical measuring received from the principle $t = m_t$ as relations, Fig. 6:

$$x = \frac{hc}{E_x}; \tag{49}$$

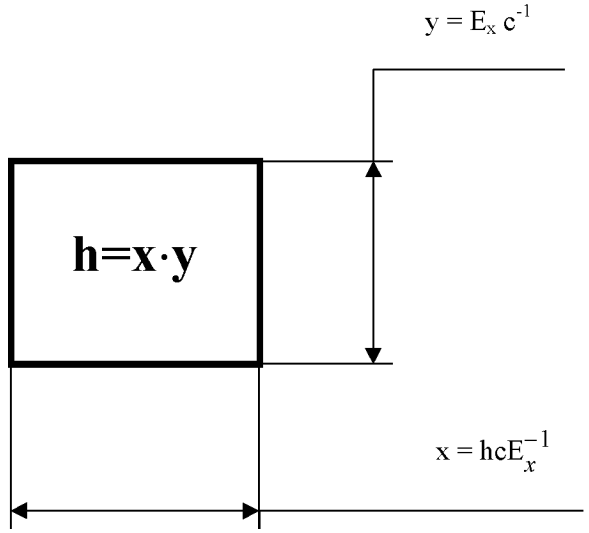

Figure 6: Parameters of a physical point = unity $[h]$ determined by energy (procedure) of measurements E_x.

$$y = \frac{E_x}{c}, \tag{50}$$

where E_x is the energy spent for measuring.

The formula (49) can be obtained as well from classical backgrounds from the Planck's formula

$$E_x = h\nu_x = \frac{hc}{\lambda_x = x_{min}}.$$

The equality of energy E_x in formulas (49), (50) follows from identity $x \cdot y = h$, Fig. 6, indicating that energy E_x determines a measure of "deformation" (the shape) of a figure $x \cdot y = h$ on Fig. 6 at maintenance of its area as constant: $h = \text{const}$.

So, for example, at $E_x = c\sqrt{h} = 2.4 \cdot 10^{-3}\ erg, x = y = \sqrt{h} = 0.8 \cdot 10^{-13}\ cm$ the shape of a figure on Fig. 6 is a quadrate.

D. Gilbert: "Never and none problem did not excite so deeply human intellect, as a problem of infinity" [14].

So, within the framework of known parameters of the Universe estimated by energy of the order $10^{78}\ erg$, the least measured length (the minimal physical infinity) under the formula (49) will make the order $10^{-94}\ cm$, where as the maximum length (maximum physical infinity) under the formula (50) will be the order $10^{68}\ cm$, as can be considered as physical sense mathematical according to the minimal and maximum infinities of linear dimensions in limits of a known total energy of the Universe.

The concept of "infinity" as something which are not having a limit, is deprived any sense it is illusion, a chimera, the nonsense, which is deprived any physical and logic substantiations.

The formula (50) and value of physical linear infinity $10^{68}\ cm$ which of it follows is received only from the principle $t = m_t$. We shall show physical sense of

quantity 10^{68} cm from classical backgrounds (without taking into account the principle $t = m_t$).

The overall length of the Universe shown as a chain of its component the nucleons (component other particles also can be taken into account) will be spotted as

$$R_{univ.} = \frac{m_{univ.} \cdot r_n}{m_n} \approx 10^{68}\ cm,$$

where $m_{univ} = 10^{57} g$ is the expected mass of the Universe,

$m_n = 10^{-24}$ g is mass of a nucleon,

$r_n = 10^{-13}$ cm is the size of a nucleon,

$\frac{m_{univ.}}{m_n} \approx 10^{81}$ is known Dirac's number (number of nucleons in the Universe). The result obtained from the classical backgrounds is compounded with the result which following from $t = m_t$ under the formula (19) as $R_{univ.} = (m_{univ.} = t_{univ.}) \cdot c \approx 10^{68}$ cm.

The formal method when the light velocity is equated to unity $c = 1$ is applied frequently in physics for simplification of expressions. Lack of an opportunity in essence to express the physical nature of unity through light velocity is caused by a prohibition. The prohibition follows from the rule of combination of velocities in a special relativity, therefore the mathematical operations are forbidden:

$$1 + 1 = \frac{c + c}{\frac{c^2 + c^2}{c^2}} = c = 1. \tag{51}$$

In a case $1 = h$ of such prohibition does not exist:

$$1 + 1 = h + h = 2h = 2. \tag{52}$$

Thus, the physical sense, the nature of mathematical unity, number, mathematics is the universal fundamental Planck's constant h, the singleness, fundamental indivisibility, integrity, a constancy of this constant determines its role of the fundamental physical etalon of mathematical unity that creates the backgrounds to that at some minimal, partial, quantum, single level of the nature the mathematically identical expressions should be identical and physically.

The revelation of the physical nature of mathematics inevitably gives that in mathematics, as well as in physics, the fundamental indeterminacy relation at fulfillment of mathematical operations should be appeared. Therefore any mathematical operation which received attributes of physical operation cannot be executed to a closer approximation, than the fundamental quantum of action equal to the Planck's constant.

So, algebraic operation of a view

$$a + b = c \tag{53}$$

will find physical sense and can be carried out with the limiting precision no more, than

$$\{a\}\,[h] + \{b\}\,[h] = \{c\}\,[h] \pm h, \tag{54}$$

in this connection the expression (54) can be also the physical justification of K. Gedel's theorem about incompleteness, indeterminacy of the formal arithmetic, mathematics.

From the expression (54) copied as

$$(\{a\}\,[h] + \{b\}\,[h] - \{c\}\,[h]) = 0 = \pm h, \tag{55}$$

relevant to value

$$0 = \pm h, \tag{56}$$

the physical sense of the "zero" representing indeterminacy with precision, in a limit, $\pm h$ follows.

"Zero" in sense of "anything" has no physical sense. It is nonsense, on definition of ancient Greeks, "the nature does not know emptiness."

Therefore A. Puankare's estimation is interesting: "We should search for a mathematical idea there where it has remained pure, in arithmetic." [15].

From above mentioned backgrounds the opportunity for detection of physical sense of natural lines of numbers, imaginaries, irrational numbers, and irrational transcendental numbers also is received.

So, imaginaries

$$a + bi = c \tag{57}$$

will find physical sense as

$$\{a\}\,[h] + \{b\}\,[h]\left(\sqrt{-h}\right) = \{c\}\,[h]\,. \tag{58}$$

The physical sense of irrational transcendental number e as the bases of a hyperbolic logarithm will be spotted from a limit

$$\lim_{x \to \infty}\left(1 + \frac{1}{x}\right)^x = \lim_{\upsilon \to c}\left(h + \frac{h}{\upsilon}\right)^{\upsilon}, \tag{59}$$

where $1 = h$, $x = \upsilon$ the physical sense variable is velocity, whence

$$(x \to \infty) = (\upsilon \to c)\,. \tag{60}$$

The physical sense of irrational transcendental number $\pi = 3,14...$ will be spotted from the formula of Euler

$$e^{i\pi} = -1 \tag{61}$$

and will make

$$\pi = \frac{2ln\left(\sqrt{-h}\right)}{\sqrt{-h}}. \tag{62}$$

It is known, that all fundamental particles composing the nature as whole, are subdivided at two various classes (fermions and bosons) which differ among themselves by the spin performances which expressed by number $\frac{1}{2}h$ odd for fermions and even for bosons.

To this indication all fundamental particles can be noted as lines (here $\frac{1}{2}$ is adopted for 1):

$$0h; 1h; 2h; 3h; ... \tag{63}$$

that corresponds to the positive integers of numbers, but only without Planck constant h:

$$0; 1; 2; 3; ... \tag{64}$$

It is known, that from fermions can be formed both fermions and bosons, [3], that also corresponds to property of numbers of the positive integers to form of odd numbers both even and odd numbers.

Hence, such especially physical indication proper in all particles as the spin expressed through a constant h, also reflects the physical essence of number, mathematics. The universal fundamentality, generality of this indication in objects of the nature allows artificially to miss, "to not note" it, in mathematical operations above them.

It is possible to expect, what exactly in physical, a fermion-boson interpretation of the numbers nature is latent the solution of property of even numbers to be decomposed on the total of two odd prime, not having dividers which 200 years are known, but is not proved.

Physical properties of mathematics (physmathematics) become appreciable in a quantum mechanics as non-observance of postulates of classical mathematics by not commuting operations. So, for example, in classical mechanics where coordinates q and impulses P are usual numbers for which the permutable law is observed as

$$q \cdot p = p \cdot q,$$

Whereas in a quantum mechanics q also P are non-commuting functional

$$q \to \hat{q}, P \to \hat{P},$$

for which

$\hat{q} \cdot \hat{P} \neq \hat{P} \cdot \hat{q}$ or $\hat{q} \cdot \hat{P} - \hat{P} \cdot \hat{q} \neq 0$ indicating that the physics superimposes restrictions on boundaries of applicability of postulates of classical mathematics in physics. [7].

J. Manin: "The mad idea which will underlie the future fundamental theory, will be comprehension of that the physical sense has some mathematical fashion which was not related to a reality earlier." [16].

In a viewed case the prognoses formulated above are implemented by acceptance "mad," but not contradictory principle of equivalence of time and the mass, ensuring an opportunity to identify mathematical quantum-point-unity with physical quantum of Planck constant as $I = h$ with an opportunity of build-up of not contradictory physical mathematics "physmathematicses" which follow from here, and as a corollary, the transformation of mathematics postulates to physics postulates in terms of h and c. This is excluded an abstractness of mathematics.

Consistency of such statement follows from that fact, that any mathematical operations cannot be executed without expense of work-energies-mass. Thought mathematical process also is accompanied by expense of energy-mass at the work of brain neurons.

I. Njuton's work which has published in 1687 "The mathematical beginnings of natural philosophy" in the modern transcription could be termed "The mathematical beginnings of physics." The problem considered above can be formulated as "The physical beginnings of mathematics."

For a science a question that the abstract mathematics or empirical physics is primary is not trivial.

The principle of equivalence of time and mass solves this problem, ensuring an opportunity to consolidate these sciences in the uniform physical science expressed in terms of, in language of the universal fundamental Planck constant and light velocity, than the opportunity to make one more step on a way of embodying of a universal philosophical principle about unity of science, the nature is ensured.

7. Conclusion

Lui de Brojl: "The science history shows that the progress in science is constantly impeded by tyrannical influence of particular concepts when they started to view as dogmas. For this reason, the principles, which began to be accepted without discussion, are necessary to expose periodically to an in-depth analysis" [6].

In a viewed case it is offered to discuss a fundamental principle which accepted without discussion in view $t \neq m_t$ as dogma earlier.

A. Ejnshtejn: "Than the theory postulates is easier, than the theory application is more widely and than the phenomena which it integrates are more different that of the greater trust the theory deserves." [17].

The principle $t = m_t$ corresponds to all these requirements. It is extreme prime (all from two letters). It has a general scope as parameters of mass and time are universal. It integrates completely various on the modern representations of concept of physics, such as mass and time.

P.L. Kapitsa: "Discovery of any new phenomenon in the nature should be estimated the more considerable, than is more changes its can demand from view and theories existing at present... we observes constantly in a science, than the discovery is more fundamental that it can be easier formulated." [5].

Examples.

Classical (Newton's) mechanics is based on *the elementary* principle of equality of action and counterac-

tion

$$\overline{F_1} = -\overline{F_2}.$$

The electrodynamics is based on *the elementary* principle of an electromagnetic induction

$$E_{induction} = -\frac{\Delta\Phi}{\Delta t}.$$

The thermodynamics is based on *the elementary* principle of equivalence of thermal and mechanical work

$$Q = A.$$

The quantum mechanics is based on *the elementary* principle of a constancy of quantum of action

$$h = const.$$

The special relativity theory is based on *the elementary* principle of a constancy of light velocity

$$c = const,$$

The general relativity theory is based on *the elementary* principle of equivalence of gravitational and inertial masses

$$m_\gamma = m_a.$$

The principle of equivalence of time and mass is *elementary* also

$$t = m_t.$$

It also can appear fruitful as it has been shown, for this purpose already there are weighty backgrounds.

S. Gleshou: "The most of physicists trust in establishing simplicity of the nature. For us it is one of the most powerful supervising principles. Not time this blind belief appeared true." [6].

The principle $t = m_t$ has the indicated sign "establishing simplicity."

A.D. Chernin: "We shall directly tell that the hypothesis expressed till now about time creates a feeble impression. Absolutely new view which far is beyond habitual representations is required obviously. Certainly, thus it is necessary to be based on the theory of relativity and the quantum theory." [18].

The principle $t = m_t$ ensures such opportunity to express time and not only time, and all physics in terms of the universal fundamental stationary values h and c, defining a theory of relativity and a quantum mechanics in their modern shape.

D.A. Kirzhnits: "As the physics all in the greater degree becomes uniform the expected revolution in it is swept all physics." [19].

The considered new principle of equivalence of time and mass gives in the corollaries, permitting to revise the basic concepts of the modern natural sciences. In mathematics it is the basic geometrical and mathematical fashions, in physics it is concepts of time, mass, spaces. It is possible to expect, that the chosen way will be one that will give in embodying above mentioned prognoses.

Perhaps, the necessity for time as a self-maintained unit of measurement will naturally disappear. It will transfer in the discharge of physical illusions, chimeras and becomes a synonym of "phlogiston," "teplorod" in thermodynamics. In this connection "the time arrow" is a arrow of energy-mass and anything else thus does not occur. "Time" does not "flow" in the same measure as the "teplorod = phlogiston" in thermodynamics does not "flow."

I.R. Prigozhin: "The reversibility of laws of dynamics, no less than laws of both fundamental sciences created in XX century, a quantum mechanics and a theory of relativity, expresses such radical refusing of time what never could imagine any culture, any collective knowledge." [20].

R. Penrouz: "In my opinion, our modern pattern of a physical reality, especially in that, as to the nature of time, is fraught with the strongest shock, even more the strong, than what was caused with a theory of relativity and a quantum mechanics in their modern shape." [21].

I.R. Prigozhin: "The greatest surprise causes that the solution secular a problem-paradox of time gives the solution and other problems of a modern physics [21]. Time is a key to understanding of the nature." [4]

The considered consistent principle $t = m_t$ and the corollaries follows from it create the backgrounds for embodying above mentioned prognoses.

D. Uiler: "For certain there will occur day when we shall see, that the principles underlying all real, are so obvious and so fine, that all of us shall be surprised, speak each other: as happened, that we so much time were blind!!!" [22].

This definition known physicist answers "so obvious and so fine" (on D. Uiler) the consistent principle $t = m_t$ with all productive consequences which follows from it. But it should be already both new physics, and new mathematics (physmathematics), both a new astrophysics, and new philosophy, both new theology, and a new science as a whole.

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Spacetime & Substance, Vol. 4 (2003), No. 3 (18), pp. 136–139
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PRINCIPLES OF THE NEW PARTICULAR RELATIVITY THEORY

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Received March 15, 2003

Received in final form May 19, 2003

In this article the hypothesis about a possibility of distinction of the speed's supremum of speed of substance interaction from speed of light in vacuum is offered, arguments in favor of it are suggested, the possibility of construction of a New Particular Relativity Theory (NePaRT) without a principle of independence of the light's speed is demonstrated.

1. Introduction

Basis of the Einstein's particular (special) relativity theory (PRT) are two postulates: the Principle of independence of light's speed : " *Speed of light in vacuum in all inertial systems of reference(ISR) is constant and does not depend on speeds of a source and a receiver of light* "; and the Principle of a relativity: " *All physical phenomena at identical entry conditions are equally resulted in all ISR* ". (in Einstein's formulation [5, c.147]). With their help it is possible to deduce Lorentz's transformations - the ratio, which tied values of all coordinates in various inertial systems of reference. In PRT the formula of Doppler effect expressing dependence of received frequency of light from emitted frequency of light is well known. Check of this formula has served as confirmation of Einstein's PRT. In "The Encyclopedia of Physics" [3, v.3, p.501] it is told, that in 1986 formula Doppler effect is checked up with accuracy $3 \cdot 10^{-4}$. Check of this formula has served as confirmation of the Einstein's relativity theory. But why accuracy of performance of this formula is so insignificant? In fact values included in it are measured with much more accuracy: frequency — 10^{-16}, speed — $4 \cdot 10^{-9}$, a corner — $5 \cdot 10^{-10}$.

Whether there are no the physical reasons, which not allow to increase accuracy of check of performance of this formula? In fact opportunities for this purpose are available, moreover, the formula is applied as to calculations of speeds of streams of gases in galaxies, so and other appendices where required accuracy of calculations should be not less than 10^{-5}. There are also other reasons for doubt in accuracy of this formula, for example, non symmetric distance and redshift from jets, removing from us, for some quasars in comparison with redshifts of these quasars and their jets approaching to us.

As the inference of formula Doppler effect is based on PRT, maybe, the point is in this theory?

Logunov [2] has shown, that for an inference of Lorentz's transformations in the flat Euclidian static universe the Principle of an independence of light's speed is not required, enough one Principle of relativity. Moreover, from the Principle of a relativity an existence some constant (we shall designate it c_L — **a Logunov's-Lorentz's constant**) follows in all ISR. It has dimension of a speed, and on sense of these transformations it is the maximal allowable speed. But as this value at measurements appeared with the big accuracy is equal to speed of light Einstein has made the decision to postulate the Principle of an independence of light's speed. As to the theoretical proof of that the constant "c" in the equations of transformation of time and metric coordinates from one system of reference in another also is speed of light, so without the Principle of a constancy of light's speed such proof simply is not exist!

Therefore we offered a hypothesis:

Logunov - Lorentz's constant c_L differs from speed of light.

It is natural that this difference if it exists should be close to a modern accuracy of measurement of light's speed.

Concerning the term "speed of light" in the formulation of this hypothesis is necessary to note, that here it is speed of photons in a system of reference of the motionless source. Photons of a given frequency radiated by a source, have some speed c, identical in all directions, by virtue of an isotropy of a conditions of their spreading.

[1] e-mail: redshift0@narod.ru

Landau and Lifshitz in [1] have shown independence from ISR of the supremum of speed of substance interaction (that gives equivalence of this value and the Logunov's-Lorentz's constant, because in one space two different constants can not be maxima). And for speed of light they esteemed only two hypotheses: the Einstein's principle of independence and "ballistic hypothesis," which states: $c' = c + V$, where c' is speed of photons in the reference system moving by speed V relatively the reference system, in which one the speed of photons equals "c". Having produced arguments against the second hypothesis, they have considered, that have demonstrated necessity first one, though there was not demonstrated alternation of these hypotheses. Actually in conditions of Einstein's Principle of relativity alternative to an Einstein's Principle of independence is the hypothesis tendered to consideration in this article, but it is not a ballistic hypothesis.

As a consequence of the offered hypothesis it turns out, that many conclusions PRT are carried out with small updating, namely:

— The value of relative speed of one body in system of reference of the second body is equal to value of relative speed of the second body in system of reference of the first body;

— There is a factor of delay of rate of time $_L$ which looks like:

$$\gamma_L = [1 - (V/cL)^2]^{-1/2};$$

— Lorentz's transformations are carried out connecting values of coordinates in two ISR the;

— There are formulas of the relativistic sum of speeds and formulas of the sum of their projections; in particular, for the motionless receiver the speed of a photon from a source which is strictly keeping away from the receiver with speed V, it looks like:

$$c_2 = (c - V)/(1 - cV/c_L^2). \tag{1}$$

But now speed of photons of a given frequency is constant only in ISR a source, in others ISR, moving concerning a source, speed of a photon can have different value, it can be both more c, and less c, in particular, it is equal to zero for a photon flying in parallel. The exclusiveness is taken off from photons, they were made even to usual particles. Only in NePaRT photons can have mass. Only now it has appeared the opportunity to receive answers to many questions connected to photons, for example: to what is equal a relative speed of two photons? — a question which standard PRT is powerless to answer unequivocally, namely: if speed's vectors of photons are not parallel, their relative speed is equal$c$; if they are collinear — it is not determined. But why it is not determined? Unless two in parallel flying photons should not have zero relative speed? For real objects it is conclusive. If photons are real... That is, formulas PRT are reflect reality inexact.

Therefore the theory that has grown out of this hypothesis is named as the New Particular Relativity Theory, or NePaRT (NeoPRT).

2. Restrictions of applicability of physical theories, principles and postulates; and Supremum of speed of substance interaction

1. Any physical theory has the limited scope.

Second, it has the limited range of definition that is carried out with some given accuracy for the parameters limited in the values in aggregate and-or separately. For unlimited basically parameters such restriction always happens both from above and from below, for limited — near to limiting values.

First, it is applied to the limited class of the phenomena.

Second, it has the limited range of definition that is carried out with some given accuracy for the parameters limited in the values in aggregate and-or separately. For unlimited basically parameters such restriction always happens both from above and from below, for limited - near to limiting values.

2. The formula of any theory treating the physical law corresponding to it, gives approached (and sometimes probable) value.

First, because of the limited accuracy of definition of parameters and constants included in the formula.

Second, because of the approached formula representing this law. Frequently in formulas insignificant members because of their small value are rejected. There are formulas for which there is no exact expression (such as "not taken integral").

Third, because of the approached, idealized form of the description of this law.

For example, Coulomb formula $F = KQq/r^2$ expressing dependence of force of an attraction (pushing away) between electric charges. The formula is carried out for motionless charges which sizes are considered as dot, that is infinitesimal in comparison with distance between them. The formula is not carried out for small distances, smaller the size of atom, but not for the reason, that we do not know the size of a charge in the charged particles (the size of an electron with sufficient accuracy is dot in comparison with the size of atom) but that on such distances there is a phenomenon of shielding. The formula cannot be checked up for very big distances and for very big charges. It is unknown also a feasibility of the formula for charges smaller than quark charge as we have not those.

3. As principles and the postulates concerning to physical values, inherently are physical theories they, as well as theories, can be applied only with the certain restrictions.

For example, Einstein's postulate on a constancy of light's speed in any inertial system of reference. It concerns to real physical parameter - speeds of photons. It is possible to check up a postulate only for a limited speed of a source. And for the speed of a source close to limiting value, the postulate obviously cannot be applied by virtue of the previous reasons. So it is quite natural, that in the theories constructed on its basis the results can turn out, which are not compatible with physical sense.

4. Supremum of speed of substance interaction is the constant

How then to act with the statement that supremum of speed of substance interaction in the universe is the constant?

First, it is not a postulate, only the theorem. Really, if to assume, that this value depends on speed of a source or the receiver it will not be the top side.

Second, this value does not correspond with any physical object. It is not speed of any object, it is the top limit of such speeds.

Therefore the destiny of the theory or a postulate does not threaten this statement, it will exist in a constant kind until the universe exists and there is substance in it.

3. Calculation of speed of photons

It is obvious that in own system of reference of the source (OSRS) where the source is motionless, the photons of the given frequency radiated by it, have some speed$c$, identical in all directions, valid isotropic conditions of their distribution. In OSRS for the photon has got in the moving receiver, direction of speed of a photon should "outstrip" the receiver. Let the source has velocity V and the corner δ between a direction of movement of photons from a source and vector V. Thus this corner δ does not vary during movement.

Then in own system of reference of receiver (OSRR) where the source moves with speed V, the photons radiated by it, get additional speed depending on a direction of movement of a photon, NePaRT agrees. Resulting speed of photons $_2$ in OSRR and the corner a between a direction of their movement from a source and vector V is determined under formulas of the relativistic sum of speed's projections on a direction of speed V:

$$c_{2,X} = (c+V)/(1+c\cdot V\cdot\cos\delta d/c_L^2); \qquad (2)$$

$$c_{2,Y} = c\cdot\sin\delta[1-(V/c_L)^2]^{1/2}/(1+c\cdot V\cdot\cos\delta d/c_L^2); \qquad (3)$$

$$c_2 = (c_{2,X}^2 + c_{2,Y}^2)^{1/2}; \qquad (4)$$

$$\cos a = c_{2,X}/c_2,$$

where $c_{2,X}$ and $c_{2,Y}$ are accordingly x- and y-projections of speed of photons c_2.

Whence we receive speed c_2, expressed through c, V, c_L and a. We carried out transformations in condition of the real assumption in our validity: $V < c$. Condition $V \geq c$ in this article is not considered.

Let's choose that decision of this system of the equations which at aspiration c and c_L to infinity gives a parity $\cos\delta = \cos a$.

Let's designate $\beta = V/c_L$; $\gamma_L = [1-(V/c_L)^2]^{1/2}$; $\gamma = [1-(V/c)^2]^{-1/2}$; $\gamma_K^{-1} = (\gamma^{-2}\sin^2 a + \gamma_L^{-2}\cos^2 a)^{1/2}$.

The size γ_K can be named "scale circular" as by the definition it changes from γ_L up to γ depending on a corner a.

Let $k = 1 - c/c_L$ is a factor of difference between speed of light and supremum of speed of substance interaction. In article [4] this factor is approximately empirically determined, as $k = 2.8\cdot 10^{-11}$.

In these designations it is received:

$$c_2 = c_L[1 - \frac{(1-(1-k)^2)(1-\beta^2\cos^2 a)^2}{(\gamma_L^{-1} + \beta(1-k)\gamma_k^{-1}\cos a)^2}]^{1/2}. \qquad (5)$$

In particular, at strict moving away of a source from receiver, that is, at $\cos a = -1$, the formula (1) turns out. This formula gives value of speed of a photon in OSRR depending on a direction and velocity of a source, therefore it is possible to use it for the proof or refutations of NePaRT.

4. The analysis of the formula of photons speed

In "The Encyclopedia of Physics" [3, v.4, p. 549] speed of light is determined for the present moment, as $c = 299792458.0 \pm 1.2$ m/sec. Though accuracy here makes $4\cdot 10^{-9}$, at the present stage accuracy of measurement of speed of light $5\cdot 10^{-11}$ is achievable.

Probably, the reason of this insufficient accuracy of definition of speed of light is made in inconstancy of speed of photons.

For the analysis of the formula (2) we shall consider the ratio of speeds c_2 and c_L: $u(\beta, a) = c_2/c_L$.

As distinction between c_L and c is outside accuracy of definition of speed of light accessible now, it is possible to suggest that in formulas (1) and (2) c_L coincides with the above-stated size 299792458.000 m/sec, and speed of light $c = (1-k)c_L = 299792457.992$ m/sec. Here $k = 1 - c/c_L = 2.8\cdot 10^{-11}$ is factor of difference between speed of light and supremum of speed of substance interaction, approximately empirically determined in article [4]. But it is possible to

count, that speed of light c coincides with the above-stated size 299792458.000 m/sec, and $c_L = c/(1-k) =$ 299792458.008 m/sec, — on size $u(\beta, a)$ this choice practically will not affect. Most likely, in vacuum size of factor of difference between speed of a photon and supremum less than one calculated in article [4], as in real intergalactic and interstellar space density of substance (and, hence, an optical density) not zero, and consequently the measured effect of change of speed of photons for Supernovae accumulates from an influence of environment (delay plus redshift) and the contribution of formulas for a relativistic difference of speeds of Supernovae's parts and photons radiated by it.

The analysis of the formula (2) shows, that at anyone a for $\beta < 0.55$ it turns out $|u(\beta, a) - 1| < 10^{-10}$, and at $\beta < 0.95$ it turns out $|u(\beta, a) - 1| < 10^{-8}$ that is distinction of values of formulas in this range of definition is within the limits of detection at the present stage. The greatest rejection from 1 at $\beta <= 1 - 10^{-9}$ is marked in area $a = \pi$. We receive at $\beta <= 0.972$ accuracy of concurrence with 1 $u(0.972, a) = 1 - 2 \cdot 10^{-9}$. At the greater speed it is received the big distinctions: $u(0.99999972, a) = 1 - 2 \cdot 10^{-4}$ and it is clean at $a = \pi$, at other corners - distinction is less.

5. Conclusions

1. In the flat Euclidian static Universe in condition of the relativity principle of it is possible to construct a New relativity theory without the Principle of an independence of light's speed.

2. The size c_2/c_L, differs from 1 less, than on $2 \cdot 10^{-N}$, for relative speed of source $V < (1 - 2.8 \cdot 10^{-11+N})c_L$ at $N = (1 - 10)$. At $V >= (1 - 2.8 \cdot 10^{-10})c_L$ difference of this attitude from 1 can make more than 20 %.

3. Accuracy of 10^{-4} concurrences from 1 relation c_2/c_L in the formula of speed of a photon (2) is achieved for all corners a and almost all range of speed of a light's source, namely at $V < (1 - 5.6 \cdot 10^{-7})c_L$.

4. Orbital speed of the Earth practically does not influence speed of photons from stars, only on a corner of an aberration. Speed of stars and galaxies concerning the Earth almost does not influence speed of photons from them.

5. The above-stated calculations show, that all experiences spent till now by definition of speed of light do not contradict NePaRT.

6. Formulas (1) and (2) can be used for check of speed of photons from a moving source with the purpose of a refutation or confirmation of an offered hypothesis.

7. There is an interest for check of NePaRT be supervision of the secondary photons flying in various directions from a downpour of ions, formed by a space particle with ultrahigh energy.

8. The exclusiveness is taken off from photons, they were made even to usual particles. Only in NePaRT photons can have mass.

References

[1] L.D. Landau, E.M. Lifshits. "The Field Theory," Moscow, Nauka, 1988 (in Russian).

[2] A.A. Logunov. "Bases of the Theory of the Relativity," Moscow, 1982 (in Russian).

[3] "The Encyclopedia of Physics," Moscow, Sovetskaya Encyclopediya, 1988–1992 (in Russian).

[4] A.M. Chepik. "Supremum Speeds of Interaction of a Matter," *Spacetime & Substance*, No. 3 (13), 2002, p. 122.

[5] A. Einstein, L. Infeld. "Evolution of Physics," Moscow, Nauka, 1965 (in Russian).

Spacetime & Substance, Vol. 4 (2003), No. 3 (18), pp. 140–144
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"GRAVITATION, COSMOLOGY AND RELATIVISTIC ASTROPHYSICS"

2nd International Gravitation Conference in Kharkiv

(June 23–27, 2003, Kharkiv, Ukraine)

SCIENTIFIC PROGRAM

Monday, JUNE 23

14.30-18.00 — GRAVITATION AND INTEGRATED THEORIES
(Chairman V.N. Melnikov)

— **Vladimirov Yu.S.** United 8-measurement geometrical model of physical interactions (40+10 min);
— **Fomin P.I.** On quantization of space-time on Planck gauges (35+10 min);
— **Larionov M.G.** The quantum character of the physical vacuum structure (25+10 min);
— **Baburova O.B.** Dark matter as matter with dilaton charge in Weyl-Cartan spacetime (20+5 min);
— **Zaslavsky O.B.** Exact solutions in semiclassical 2D dilaton gravity (25+5 min).
— **Lompay R.** Effect Fulling-Unru in generally covariant formalism of 1-st order on time (20+5 min).
— **Golubiatnikov A.N.** Gravitational field as mass-exchange continuum (20+5 min).

Tuesday, JUNE 24

09.00-13.00 — GRAVITATION AND INTEGRATED THEORIES
(Chairman P.I. Fomin)

— **Melnikov V.N.** Gravitational Constant, Extra Dimensions and Unified Models (40+5 min).
— **Oleynik V.P.** Properties island gravitating self of model with the Maxwell - Weil- Yung - Mills fields (20+5 min).
— **Semenov Yu.A.** Classification of the spherically-symmetric gravitational field radiants with traceless curvature of the Ricci in GR (20+5 min).

Coffee break (10 min)

— **Oleynik V.P., Semenov Yu.A.** System of two fermion fields in GR (20+5 min).
— **Zinchenko E.N.** Model operation of space string motion in gravitational field of the Raysne-Nordstrem black hole (20+5 min).
— **Sitenko Yu.A., Gorkavenko V.N.** On induce of a vacuum energy-momentum tensor multivariate brane (20+5 min).
— **Balyberdin V.V., Nechaev A.V.** On recording change of system mass at an interior irreversible process (20+5 min).

13.00-14.00 — Lunch break

14.00-17.20 — GRAVITATION AND INTEGRATED THEORIES
(Chairman Yu.S. Vladimirov)

— **Rvachev V.L., Dabyagan A.V.** On the positive integers doctrine and law of gravitation (15+5 min).
— **Verozub L.V.** Gravitation — field or curvature? (25+5 min).
— **Galiakhmetov A.M.** Eectly solvable models in Einstein – Cartan cosmology with scalar field (20+5 min).
— **Belyaev V.B.** Extra force in five-dimensional space-time theory (20+5 min).
— **Lompay R.** Quantum mechanics of a relativistic scalar particle in the uniformly accelerated of reference frame (20+5 min).

Coffee break (10 min)

— **Tsechmistro I.Z.** Physical pattern of the world last 20 years: substance, on which the concepts of space-time and even sets are not spread a gravitation (25+5 min).
— **Katanaev M.O.** Geometric theory of defects and gravity (25+5 min).
— **Lelyakov A.P.** The possibility of originating planar–symmetrical structures in the pseudo-Riemannian spaces (20+5 min).
— **Chernitsky A.A.** The uniform approach to electromagnetic and gravitational interactions on the basis of the nonlinear electrodynamics (25+5 min).
— **Friedman Y., Gofman Y.** Transformations between accelerated systems based on symmetry (20+5 min).

17.30-18.30 — POSTERS AND DISCUSSION

— **Kurbanova V.** Photons in a gravitational wave bacground: kinetic approach.
— **Guts A.K., Palesheva E.V.** Causal manifestations of time and their cosmological effects.
— **Baranov A.M., Bardushko N., Talanov A., Tegai S.** On cosmological solution with torus topology.
— **Korukhov V.V.** The inferior border of macrosystems entropy.
— **Korukhov V.V.** Dependence of energy and impulse of fundamental particles in view of existence of fundamental length.
— **Lompay R.** Homogeneous static gravitational field in the General Relativity.
— **Pacera Yu.** Motion of rotation body in Thirring metric.
— **Sannikov-Proskuryakov S.S.** About non-inertial frames.
— **Grunskaya L., Balakin V., Isakevich V.** Models of mechanisms of oscillation of ultra-low-frequency of electrmagnetic field variations of a ground stratum under activity of gravitational - undular radiation of astrophysical radiants.
— **Mychelkin E.** Scalar Gravity — it is seriously.
— **Popov A.A.** Analytical approximation of the stress-energy tensor of a quantized scalar field in static spherically symmetric spacetimes.

Wednesday, JUNE 25

09.00-13.00 — COSMOLOGY
(Chairman M.G. Larionov)

— **Peletminsky S.V., Achieser A.I.** On the kinetic theory of gravitating systems (40+5 min).
— **Shtanov Yu.V.** Features of braneworld cosmology (35+5 min).
— **Korkina M.P. and Kopteva E.M.** Fridman's model with pressure at the presence of the cosmological constant (20+5 min).
— **Kursunoglu B.N.** Recent developments in gravitational theory and an intrinsic cosmological parameter (20+5 min).

Coffee break (10 min)

— **Konoplya R.A.** Different aspects of black hole quasinormal behavior (20+5 min).
— **Bronnikov K.A.**, Nonsingular cosmology of a global monopole (20+5 min).
— **Korkina M.P. and Turinov A.N.** "Interstice" in the observed Universe (20+5 min).
— **Drobyshevski E.M, Nikonov N.N.** Experimental detection of dark electric matter objects (25+5 min).
— **Artyukh V.S.** The nev radio astronomy cosmological test (20+5 min).

13.00-14.00 — Lunch break

14.00-17.20 — COSMOLOGY
(Chairman M.P. Korkina)

— **Kaminker A.D., Ryabinkov A.I. and Varshalovich D.A.** Cosmological variations of the space-time distribution of absorption systems in quasar spectra (30+5 min).
— **Larionov M.G.** The background radiation from cosmological distant sources (30+5 min).
— **Flin P.** Large scale periodicity in the redshift distribution (25+5 min).
— **Khodyachikh M.F.** Cosmological periodicities in the full and selective samples of quasars (20+5 min).

Coffee break (10 min)

— **Zhuck N.A., Moroz V.V., Varaksin A.M.** Spatial distribution of quasars and model of the Universe (20+5 min).
— **Mishra R.K.** Cosmological models with $G\rho/\Lambda$ as the constant(20+5 min).
— **Alexandrov Yu.V.** Bicomponent cosmological models in spaces of arbitrary number of measurings (20+5 min).

17.30-18.30 — POSTERS AND DISCUSSION

— **Vartanyan Yu.L., Grigoryan A., Sarkisyan T.** On the strange quark's dwarfs.
— **Kovalev Yu.Yu., Kovalev Yu.A.** On the nature prompt radiovariability of quasars and microquasars.
— **Bannikova E.Yu. and Kontorovich V.M.** Allocation of spectral coefficients in a neighbourhood of knots and the hot butterfly of space jets.
— **Guziy S., Panko E., Shlyapnikov A.** Investigation of areas a gamma - flashing in an astronomical observatory of NSU.
— **Zakhozhay V.A.** Statistical method of representation of allocation of mass in the evolving galaxy.
— **Rudakov V.** Planck's "natural unities" and cosmology.
— **Tararoev Ya.** Modern cosmology and problem of "epistemological abyss".
— **Shikin I.S.** Mathematical description for gasdynamical flow of stellar wind type.
— **Alaverdyan G.B., Harutyunyan A.R., Vartanyan Yu.L.** On some features of neutron stars with a strange quark core.
— **Sadoyan A.A.** Gravitational waves from neutron stars.

Thursday, JUNE 26

09.00-13.00 — RELATIVISTIC ASTROPHYSICS
(Chairman V.S. Beskin)

— **Beskin V.S.** Axisymmetric stationary flows in astrophysics (40+10 min).
— **Verozub V.L.** On the nature of supermassive unobstructive objects in spectrums of galaxies (30+5 min).
— **Galiakhmetov A.M.** Static spherical configuration with linear mass function in the Einstein-Kartan Theory (20+5 min).
— **Roshchupkin S.N.** Null membrane in the Schwarzschild spacetime (20+5 min).

Coffee break (10 min)

— **Prigara F.V.** n accretion disk and radio spectra of pulsars (20+5 min).
— **Artamonov B., Koptelova E., Sazhin M., Shimanovskaya E., Yagola A.** On application of regularizing algorithms to reconstructing stitution images of gravitational lenses (20+5 min).
— **Gladush V.D.** On the effective action for a spherical dust shell in the General Relativity (20+5 min).

13.00-14.00 — Lunch break

14.00-16.30 — Excursion

17.00 — Banquet

Friday, JUNE 27

09.00-13.00 — RELATIVISTIC ASTROPHYSICS
(Chairman V.M. Kontorovich)

— **Vargashkin V.Ya.** On some properties of gravitational lensing (20+5 min).
— **Ivashin A.P., Kovalevsky M.Y., Logvinova L.V.** Superfluidity of neutron stars matter with tensor order parameter (20+5 min).
— **Tsvyk N.A.** Ont dynamics of relativistic plasma in anagalactic radioradiants (20+5 min).

Coffee break (10 min)

— **Bliokh K.Yu., Kontorovich V.M.** Influence of thermal pressure on stability of gravitating self toroidal vortex (25+5 min).
— **Bannikova E.Yu., Kontorovich V.M.** Jeans mass of a toroidal vortex of degenerate gas (20+5 min).
— **Kryvdyk V.G.** Test for search of collapsing stars (20+5 min).
— **Gibson C.H.** Plank-Kerr Tubulence (20+5 min).

13.00-14.00 — Lunch break

14.00-18.00 — GENERAL DISCUSSION. Closing of the Conference

Parallel section

Thursday, JUNE 26

09.00-13.00 — ALTERNATIVE THEORIES AND DEBATABLE PROBLEMS
(Chairman A.A. Minakov)

— **Vladimirov Yu.S.** Metaphysics and theory of gravitation (40+10 min).
— **Vereschagin I.A.** Gravitation without singularities and black holes (20+5 min).
— **Krasnoholovets V.** Newtons static potential as the spatial phon formed dynamic inertons (20+5 min).

Coffee break (10 min)

— **Zhuck N.A.** Quadrodynamics as the new approach to integrating fundamental interactions (20+5 min).
— **Galaev Yu.M.** Effects of anisotropic distribution of electromagnetic waves in proximity of the Earth and their relation with alternate hypothesis of gravitation (20+5 min).
— **Nikolaev G.V.** On the nature of gravitational forces and role of world medium in interpretation of optical observations (20+5 min).
— **Balabay V.I.** Experiments verifying the uniform nature of gravitational and magnetic fields (20+5 min).

13.00-14.00 — Lunch break

14.00-16.30 — Excursion

17.00 — Banquet

Friday, JUNE 27

09.00-13.00 — ALTERNATIVE THEORIES AND DEBATABLE PROBLEMS
(Chairman V.M. Kontorovich)

— **Kinderevich A.V.** Kozyrev's ideas and their development (20+5 min).
— **Kolpakov N.D.** On coherent state of an ether (20+5 min).
— **Volchenko A.P.** On substance of the relativity principle (20+5 min).
— **Sharypov O.V., Pirogov E.A., Zagoruyko V.A., Grishin S.G.** On the problem of interpretation of "cosmic vacuum" properties (20+5 min).

Coffee break (10 min)

— **Aleshinsky V.G.** New sight on an electrodynamics (20+5 min).
— **Terrovere V.R.** On the scalar theory of gravitation (20+5 min).
— **Boukalov A.V.** The reason of nonreversibility and one-dimensionality of time. Possible age of the Universe (20+5 min).
— **Fominsky L.P.** The Lesage neutrino hypothesis of a gravitation explains riddles of the Metagalaxy (20+5 min).

13.00-14.00 — Lunch break

14.00-18.00 — POSTERS AND DISCUSSION. Closing of the Conference

— **Zhuck N.A.** Modern concepts of spacetime and boundedness of Lorentz transformation laws.
— **Zhuck N.A.** The wave solutions of the Einstein's equations and problem of their physical interpretations.
— **Zhuck N.A., Moroz V.V.** Gravitation as multipolar interaction of an electrical charges of the neutral bodies.
— **Kravchenko N.V.** On the Hubble's law.
— **Kosinov N.V.** News about the gravitational constant.
— **Sharafiddinov R.S.** The united force in the nature of matter.

Spacetime & Substance
International Physical Journal

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The original manuscripts should be preferably no longer then 6 pages. They should contain no more than 4 figures. Length of the manuscript can be up to 10 pages only in exclusive cases (at arguing problems of primary importance). If the length of the manuscript exceeds 10 pages, it should be divided by the author into two or more papers, each of which should contain all pieces of a separate paper (title, authors, abstracts, text, references etc.). The Editorial Council accepts for the publication the brief reports too.

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An E-mail message acknowledging the receipt of the manuscript will be sent to the corresponding author within two working days after the manuscript receipt. If a message is not received please contact *krasnoh@iop.kiev.ua* to inquire about the manuscripts.

The Style File and Instructions for its use can be found at http://spacetime.narod.ru (sample.zip, 19 kb).

An abstract (within 20 lines) must be submitted. This one should be concise and complete regardless of the paper content. Include purpose, methodology, results, and conclusions. References should not be cited in the abstract. The abstract should be suitable for separate publication in an abstract journal and be adequate for indexing.

If the argument of an exponential is complicated or long, "exp" rather than "e" should be used. Awkward fractional composition can be avoided by the proper introduction of negative degrees. Solidus fractions (l/r) should be used, and enough enclosures should be included to avoid ambiguity in the text. According to the accepted convention, parentheses, brackets, and braces are in the order { [( )] }. Displayed equations should be numbered consecutively throughout the paper; the number (in parentheses) should be to the right of the equation.

Figures (black-and-while) should be of minimal size providing clear understanding. Breadth of the figure should not exceed 84 mm or 174 mm (in exclusive cases). Figures should be made out as separate files in the format of *.pcx (300 dpi/inch) or *.eps (minimum of kb).

Each figure must be cited in numerical order in the text and must have figure legend.

Tables should be typed as authors expect them to look in print. Every table must have a title, and all columns must have headings. Column headings must be arranged so that their relation to the data is clear. Footnotes should be indicated by reference marks [1], [2] etc. or by lowercase letters typed as superiors. Each table must be cited in the text.

The Editorial Council accepts also response on papers, published in the Journal. They should be no more than 1 journal page in length and should not contain figures but only to refer to the already published materials. But they can contain the formulas. The recalls are publishing in section "Discussion."

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Only works cited in the text should be included in the reference list. Personal communications and unpublished data or reports are not included in the reference list; they should be shown parenthetically in the text: (F.S. Jones, unpublished data, 1990).

The title of paper is permissible not to indicate. It is permissible to give only the initial page number of a paper. The format of the reference list is as indicated below.

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[1] F.W. Stecker, K.J. Frost, *Nature*, **245**, 270 (1973).

[2] V.A. Brumberg, "Relativistic Celestial Mechanics", Nauka, Moskow, 1972 (in Russian).

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