Article

Human Consciousness: Fifth Force

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Abstract

In this paper, we analyze the importance of the fields: Yukawa (nuclear level), Bohr (atomic level), Planck (Universe level- non human) and Schwinger (void structure). The interrelations of these fields guarantee the stability of the Universe and matter within. Based on our results published in this journal, we put forward the study of the binding energy of the human brain. We showed that the human mind is the field of consciousness with total energy 10^{30}GeV. This consciousness field produces the fifth consciousness force with the range 10^5km and strength 10^{-47}GeV/fm. The range of the fifth force is of the order of Moon-Earth distance. We argue that the Moon is the mirror (source) of Schumann and consciousness waves.

Keyword: Mind, brain waves, consciousness energy, consciousness force, Moon radiation.

Introduction

In paper [1], F. Calogero described the cosmic origin of quantization - The *tremor* of the cosmic particles is the origin of the quantization and the characteristic acceleration of these particles $a \approx 10$ m/s^2 was calculated. In our earlier paper [2], the same value of the acceleration was obtained and compared to the experimental value of the measured space-time acceleration.

In the following paper, we investigate the natural forces in the Universe and also the new force for the human consciousness.

We define the cosmic force — *Planck* force, $F_{Planck} = M_P\, a_{Planck}$ ($a_{Planck} \approx a$) and study the history of Planck force as the function of the age of the Universe. In addition we introduce the Bohr force for atomic scale, the Yukawa force for nuclear scale, the Schwinger force for the vacuum.

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Masses introduce a curvature in space-time, light and matter are forced to move according to space-time metric. Since all the matter is in motion, the geometry of space is constantly changing. A Einstein relates the curvature of space to the mass/energy density:

$$\mathbf{G} = k\,\mathbf{T}, \qquad (1)$$

G is the Einstein curvature tensor and **T** the stress-energy tensor. The proportionality factor k follows by comparison with Newton's theory of gravity: $k = G/c^4$ where G is the Newton's gravity constant and c is the vacuum velocity of light; it amounts to about 2.10^{-43} N^{-1} expressing the *rigidity* of space-time.

2. Universe forces

In paper [2], the model for the acceleration of space-time was developed. Prescribing the -G for space-time and +G for matter the acceleration of space-time was obtained:

$$a_{Planck} = -\frac{1}{2}\left(\frac{\pi}{4}\right)^{\frac{1}{2}} \frac{\left(N+\frac{3}{4}\right)^{\frac{1}{2}}}{M^{\frac{3}{2}}} A_P, \qquad (2)$$

where A_P, *Planck* acceleration equal, viz.;

$$A_P = \left(\frac{c^7}{\hbar G}\right)^{\frac{1}{2}} = \frac{c}{\tau_P} \cong 10^{51}\,\mathrm{ms}^{-2}. \qquad (3)$$

As was shown in paper [5] the a_{Planck} for $N = M = 10^{60}$ is of the order of the acceleration detected by Pioneer spacecrafts [3].

Considering A_P it is quite natural to define the *Planck* force F_{Planck}

$$F_{Planck} = M_P A_P = \frac{c^4}{G} = k^{-1}, \qquad (4)$$

where

$$M_P = \left(\frac{\hbar c}{G}\right)^{\frac{1}{2}}.$$

From formula (4) we conclude that $\left(F_{Planck}\right)^{-1}$ = rigidity of the space-time. The *Planck* force, $F_{Planck} = c^4/G = 1.2\cdot 10^{44}$ N can be written in units which characterize the microspace-time, i.e. GeV and fm. In that units, $k^{-1} = F_{Planck} = 7.6\cdot 10^{38}$ GeV/fm.

As was shown in paper [5] the present value of *Planck* force equal

$$F_{Planck}^{Now}(N=m=10^{60}) \cong -\frac{1}{2}\left(\frac{\pi}{4}\right)^{\frac{1}{2}} 10^{-60}\frac{c^4}{G} = -10^{-22}\,\frac{\text{GeV}}{\text{fm}}. \tag{5}$$

In papers [5, 6], the *Planck* time τ_P was defined as the relaxation time for space-time

$$\tau_P = \frac{\hbar}{M_P c^2}. \tag{6}$$

Considering formulae (4) and (6) F_{Planck} can be written as

$$F_{Planck} = \frac{M_P c}{\tau_P}, \tag{7}$$

where c is the velocity for gravitation propagation. In papers [5,6] the velocities and relaxation times for thermal energy propagation in atomic and nuclear matter were calculated:

$$\begin{aligned} v_{atomic} &= \alpha_{em} c, \\ v_{nuclear} &= \alpha_s c, \end{aligned} \tag{8}$$

where $\alpha_{em} = e^2/(\hbar c) = 1/137$, $\alpha_s = 0.15$. In the subsequent we define atomic and nuclear accelerations:

$$\begin{aligned} a_{atomic} &= \frac{\alpha_{em} c}{\tau_{atomic}}, \\ a_{nuclear} &= \frac{\alpha_s c}{\tau_{nuclear}}. \end{aligned} \tag{9}$$

Considering that $\tau_{atomic} = \hbar/\left(m_e \alpha_{em}^2 c^2\right)$, $\tau_{nuclear} = \hbar/\left(m_N \alpha_s^2 c^2\right)$ one obtains from formula (9)

$$\begin{aligned} a_{atomic} &= \frac{m_e c^3 \alpha_{em}^3}{\hbar}, \\ a_{nuclear} &= \frac{m_N c^3 \alpha_s^3}{\hbar}. \end{aligned} \tag{10}$$

We define, analogously to *Planck* force, the new forces: F_{Bohr}, F_{Yukawa}

$$\begin{aligned} F_{Bohr} &= m_e a_{atomic} = \frac{\left(m_e c^2\right)^2}{\hbar c}\alpha_{em}^3 = 5\cdot 10^{-13}\,\frac{\text{GeV}}{\text{fm}}, \\ F_{Yukawa} &= m_N a_{nuclear} = \frac{\left(m_N c^2\right)^2}{\hbar c}\alpha_s^3 = 1.6\cdot 10^{-2}\,\frac{\text{GeV}}{\text{fm}}. \end{aligned} \tag{11}$$

Comparing formulae (8) and (11)we conclude that gradients of *Bohr* and *Yukawa* forces are much large than F_{Planck}^{Now}, i.e.:

$$\frac{F_{Bohr}}{F_{Planck}^{Now}} = \frac{5\cdot 10^{-13}}{10^{-22}} \cong 10^{9}, \qquad \frac{F_{Yukawa}}{F_{Planck}^{Now}} = \frac{10^{-2}}{10^{-22}} \cong 10^{20}. \tag{12}$$

The formulae (12) guarantee present day stability of matter on the nuclear and atomic levels. As the time dependence of F_{Bohr} and F_{Yukawa} are not well established, in the subsequent we will assumed that α_s and α_{em} [6] do not dependent on time. Considering formulae (11) and (12) we obtain

$$\frac{F_{Yukawa}}{F_{Planck}} = \frac{1}{\left(\frac{\pi}{4}\right)^{\frac{1}{2}}} \frac{\left(m_N c^2\right)^2}{M_P c^2} \frac{\alpha_s^3}{\hbar} T, \tag{13}$$

$$\frac{F_{Bohr}}{F_{Planck}} = \frac{1}{\left(\frac{\pi}{4}\right)^{\frac{1}{2}}} \frac{\left(m_e c^2\right)^2}{M_P c^2} \frac{\alpha_{em}^3}{\hbar} T. \tag{14}$$

As can be realized from formulae (13), (14) in the past $F_{Planck} \approx F_{Yukawa}$ (for T = 0.002 s) and $F_{Planck} \approx F_{Bohr}$ (for $T \approx 10$ s), T = age of universe.The calculated ages define the limits for instability of the nuclei and atoms.

In 1900 M. Planck [7] introduced the notion of the universal mass, later on called the *Planck* mass

$$M_P = \left(\frac{\hbar c}{G}\right)^{\frac{1}{2}}. \tag{15}$$

Considering the definition of the *Yukawa* force (11)

$$F_{Yukawa} = \frac{m_N \upsilon_N}{\tau_N} = \frac{m_N \alpha_{strong} c}{\tau_N}, \tag{16}$$

the formula (16) can be written as:

$$F_{Yukawa} = \frac{m_{Yukawa} c}{\tau_N}, \tag{17}$$

where

$$m_{Yukawa} = m_N \alpha_{strong} \cong 147 \frac{\mathrm{MeV}}{c^2} \sim m_\pi . \tag{18}$$

From the definition of the *Yukawa* force we deduced the mass of the particle which mediates the strong interaction – pion mass postulated by Yukawa in [8].

Accordingly for *Bohr* force:

$$F_{Bohr} = \frac{m\,\upsilon}{\tau_{Bohr}} = \frac{m_e \alpha_{em} c}{\tau_{Bohr}} = \frac{m_{Bohr} c}{\tau_{Bohr}}, \tag{19}$$

$$m_{Bohr} = m_e \alpha_{em} = 3.7 \frac{\mathrm{keV}}{c^2}. \tag{20}$$

For the *Bohr* particle the range of interaction is

$$\gamma_{Bohr} = \frac{\hbar}{m_{Bohr} c} \approx 0.1\,\mathrm{nm}, \tag{21}$$

which is of the order of atomic radius.

In an important work, published already in 1951 J. Schwinger [9] demonstrated that in the background of a static uniform electric field, the QED space-time is unstable and decayed with spontaneous emission of $e^+ e^-$ pairs. In the paper [9] Schwinger calculated the critical field strengths E_S:

$$E_S = \frac{m_e^2 c^3}{e\hbar}. \tag{22}$$

Considering formula (22) we define the *Schwinger* force:

$$F^e_{Schwinger} = eE_S = \frac{m_e^2 c^3}{\hbar}. \tag{24}$$

Formula (24) can be written as:

$$F^e_{Schwinger} = \frac{m_e c}{\tau_{Sch}}, \tag{25}$$

where

$$\tau_{Sch} = \frac{\hbar}{m_e c^2} \tag{26}$$

is *Schwinger* relaxation time for the creation of $e^+ e^-$ pair. Considering formulae (25) the relation of F_{Yukawa} and F_{Bohr} to the *Schwinger* force can be established

$$\begin{aligned} F_{Yukawa} &= \alpha_s^3 \left(\frac{m_N}{m_e}\right)^2 F^e_{Schwinger}, \alpha_s = 0.15, \\ F_{Bohr} &= \alpha_{em}^3 F^e_{Schwinger}, \alpha_{em} = \frac{1}{137}, \end{aligned} \tag{27}$$

and for *Planck* force

$$F_{Planck} = \left(\frac{M_P}{m_e}\right)^2 F^e_{Schwinger}. \tag{29}$$

In Table 1the values of the $F^e_{Schwinger}$, F_{Planck}, F_{Yukawa} and F_{Bohr} are presented, all in the same units GeV/fm. As in those units the forces span the range 10^{-13} to 10^{38} it is valuable to recalculate the *Yukawa* and *Bohr* forces in the units natural to nuclear and atomic level. In that case one obtains:

$$F_{Yukawa} = 16 \frac{\text{MeV}}{\text{fm}}. \tag{30}$$

It is quite interesting that $\alpha_v \approx 16$ MeV is the volume part of the binding energy of the nuclei (droplet model).

Table1. *Schwinger*, *Planck*, *Yukawa* and *Bohr* forces [GeV/fm]

$F^e_{Schwinger}$	F_{Planck}	F_{Yukawa}	F_{Bohr}
$\approx 10^{-6}$	$\approx 10^{38}$	$\approx 10^{-2}$	$\approx 10^{-13}$

For the *Bohr* force considering formula (27) one obtains:

$$F_{Bohr} = \frac{50\,\text{eV}}{0.1\,\text{nm}}. \tag{31}$$

Considering that the *Rydberg* energy ≈ 27 eV and *Bohr* radius ≈ 0.1 nm formula (31) can be written as

$$F_{Bohr} = \frac{\text{Rydberg energy}}{\text{Bohr radius}}. \tag{32}$$

3. Human mind force

In our paper [10], we investigated the new description of the human mind. We discovered that the human consciousness (mind- soul) is a medium with internal energy $10^{30}\,GeV$. In accordance with results of paragraph 2 we can introduce the consciousness force the fifth force. According to formula (7)

$$F_{Consciousness} = \frac{momentum}{\tau} = \frac{m_c c}{\tau} = \frac{m_c c^2}{\tau c} = \frac{10^{-47}\,GeV}{fm} \tag{33}$$

In formula (33) m_c is the quantum of consciousness field= *psychon* mass = 10^{-15} eV [10] , τ is the relaxation time

$$\tau = \frac{\hbar}{E_P} = \frac{c\hbar}{E_P c} = \frac{200 MeVfm}{10^{-15} eV} \cong 1\sec \tag{34}$$

We can calculate the range of consciousness field

$$\gamma_{Consciousness} = \frac{\hbar}{m_c c} = \frac{\hbar c}{m_c c^2} = 2\times 10^{23}\, fm = 2\times 10^5\, km \tag{35}$$

It is interesting that the range of the consciousness field is the order of Moon- Earth distance. Presumably the Moon plays some important role in the human consciousness development and maintained

4. Conclusions

The main result of the paper: the soul (c0nsciousness) have the energy of the order of the *10^{30}GeV*. The human consciousness field have the range of 10^5km, and characteristic time=1 sec, which is also characteristic for Schumann waves and brain waves. The range of consciousness field is of the order of Moon-Earth distance. It suggested the influence of the Moon radiation on the Earth Schumann waves and human mind waves.

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