A POSSIBILITY OF BRAIN STIMULATION WITH OSCILLATING NEUTRINOS

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Abstract
Special properties of the first ordinary (observable) matter, produced in the universe -the oscillating neutrinos - are discussed in a context of their use for healing and stimulation of the brain.

1. Introduction

In the quantum modification of general relativity (Qmoger) [1, 2], supported by cosmic data without fitting, the matter is continuously produced by the vacuum. This is in contrast with the conventional Big Bang theory [3]. According to Qmoger, the ultralight gravitons with tiny electric dipole moment are seeping from the vacuum. The gravitons form the quantum condensate even for high temperature [1, 2]. In such condensate, signals, connected particularly with the quantum entanglement [4], can propagate faster than light. In a sense, the universe is a gigantic quantum supercomputer. In this paper it is shown that the first ordinary (observable) matter, produced by the universe - the oscillating neutrinos - have special properties, which can be useful for healing and stimulation of the brain.

Qmoger equations differ from the Einstein equations of general relativity by two additional terms responsible for production (absorption) of matter. The exact analytical solution of Qmoger equations for the size a (scale factor) of the homogeneous and isotropic universe has the form:

$$a(\tau) = a_0 \exp[H_0\tau - 2\pi(\tau/L_*)^2],\ \tau = ct,\ L_* = c\left(G\rho_0\right)^{-1/2}. \qquad (1)$$

Here subscript 0 indicates present epoch ($t = 0$), c is the speed of light, G is the gravitational constant, ρ_0 is the averaged mass density of the universe and H_0 is the Hubble constant divided by c, which is the current value of the function $H\left(\tau\right) = d(\ln a)/d\tau$. We use value $\rho_0 \approx 2.6 \cdot 10^{-30} g cm^{-3}$, which includes the ordinary matter (protons, electrons etc.) and the dark matter (invisible by the conventional telescopes). In Qmoger, the dark matter consists of indicated above gravitons (more about them below). We do not include the controversial dark energy (cosmological constant) [3], which does not exist in Qmoger. With beautiful solution (1), we also get rid of controversial hypotheses of inflation [3]. And, of course, no Big Bang.

With indicated above value of ρ_0, we have $L_* \approx 76$ billion light years (bly) [1, 2], which is comparable with the current size of the visible universe $a_0 \approx 46.5$ bly. Remarkably, $H_0 L_* \approx 2.6$. The temporal scale H_0^{-1} and the eternal scale L_* are of the same order, because currently $a\left(\tau\right)$ is relatively close to its maximum $a_{\max} \approx 1.32\ a_0$ at time $t_{\max} = (L_*^2 H_0)/(4\pi c) \approx 12.6$ billion years. It was

shown [5], that universe is globally stable during expansion ($-\infty < t < t_{\max}$). But, after that it becomes unstable and additional investigation is needed for evolution of the universe at $t > t_{\max}$.The solution (1) has no fitting parameters and is in good quantitative agreement with cosmic data [5, 1].

In nonrelativistic regime, Qmoger reproduces Newtonian dynamics, but the speed of the gravitational waves can be different from c [5]. This give us a hint, that graviton has mass (unlike photon). With scale L_* we associate the mass of graviton $m_0 = \hbar/(cL_*) \sim 0.5 \cdot 10^{-66} gram$ and electric dipole moment (EDM) $d_0 \sim m_0^{1/2} l_P^{3/2} c \sim 2 \cdot 10^{-72} gram^{1/2} cm^{1/2} s^{-1}$[1, 2], where $l_P = \left(\hbar G/c^3\right)^{1/2} \approx 1.6 \cdot 10^{-37} cm$ is the Planck scale. EDM of background gravitons can explain the baryon asymmetry of the universe (prevalence of particles over antiparticles) in terms of breaking the reflection symmetry. It is shown [1, 2], that such particles form quantum condensate even for high temperature. The ordinary matter , for now, constitute a small fraction of the mass of the universe, so, the concentration of gravitons n and characteristic scale are:

$$n = \rho_0/m_0 \approx 5 \cdot 10^{36},\ l = n^{-1/3} \approx 2.7 \cdot 10^{-13} cm. \tag{2}$$

According to (1), the universe was born in the infinite past ($a(-\infty) = 0$) from small fluctuation. But, formula (1) is solution of Qmoger differential equations for the space-time metric, which is assumed to be smooth. The smooth metric we can expect only starting with condition $a = l_P$. It is natural to associate this condition with the beginning of the universe in frame of the Qmoger theory. From that condition, using (1), we get time [1, 2]: $t_1 \approx -327$ billion years. The mass of the embryonic universe can be estimated by $M_1 = \rho_0 l_P^3 \approx 10^{-128} gram$. This result suggest existence of particles (or quasiparticles) with much smaller mass than m_0 (see also below). Any such particle we will call vacumo. It seems reasonable to suggest, that Vacuum is feeding universe with vacumos.

The next important step in the evolution of the universe is the production of gravitons with indicated above mass m_0. The corresponding condition is: $a = l$. In this case, (1) gives [1, 2] : $t_2 \approx -284$ billion years. So, it took about 43 billion years of nurturing the universe to accommodate it for production of gravitons. It seems natural, that the feeding comes from an external part of the Vacuum, which do not have to be equipped with a metric. The metrical Vacuum becomes a part of the universe, not unlike an ovary of a fruit. The mature universe transforms vacumos into gravitons, which form the background quantum condensate.

Note, that Qmoger with its seeping gravitons could also correct some deficiencies of the quantum field theory, such as inequivalent representations [6]. Indeed, the active background can eliminate unstable representation of reality.

2. Results: properties of neutrinos

During formation of galaxies (in a manner described in Ref. 7), in stars and in hot planets (Jupiter, Saturn), the local density of matter becomes large and new "ordinary"particles (including photons) are synthesized. In these processes, instead of G, the Planck constant $\hbar$ becomes important. Note, that in the Stan-

dard Model [8], from parameters $\hbar$ and c one can not construct a mass, a length scale or such characteristics as EDM. So, Standard Model, principally, can not predict absolute values of masses for observable particles and corresponding scales. In Qmoger, from c, $\hbar$ and ρ_0, we now have unique scale:

$$l_* = \hbar^{1/4} \left(c\rho_0\right)^{-1/4} \approx 10^{-2} cm. \tag{3}$$

We can rewrite (3) in the form:

$$l_* = \frac{\hbar}{cm_*},\ m_* = \rho_0 l_*^3 = \rho_0^{1/4} \left(\hbar/c\right)^{3/4} \approx 3.13 \cdot 10^{-36} gram \approx 1.76 \cdot 10^{-3} eV/c^2. \tag{4}$$

So, scale l_* corresponds to the Compton wavelength of a particle with mass of background matter occupying volume of size l_*. This indicates a mechanism of formation new particles from background gravitons. Mass m_* is determined uniquely by the new scaling. Apparently, it is a typical mass of the first generation of "ordinary" massive particles, produced by indicated mechanism from the background condensate. It is easy to expel new particles from the hot places if they are fermions, obeying the Pauly exclusion principle.

Among the experimentally observed particles, neutrino is the best candidate for being produced in this way. Indeed, mass m_* corresponds to experimental bound for the mass of neutrino [9]. The time scale:

$$t_* = \left(\hbar/\rho_0\right)^{1/4} c^{-5/4} \approx 3.3 \cdot 10^{-13} s \tag{5}$$

could be associated with formation and acceleration ($c/t_* \sim 8.46 \cdot 10^{22} cms^{-2}$) of neutrino, as well to the neutrino oscillations (transformations between three flavors of neutrinos) [9]. The physics of these oscillations can be related to interaction of neutrino with the background condensate of described above ultralight dipolar gravitons. The averaged number of gravitons interacting with such neutrino can be estimated by $N_* = m_*/m_0 \sim 10^{30}$. During a flight, neutrino can temporary carry along a coherent group of gravitons (perhaps, in a form of vortex ring). This can influence the effective mass and the flavor of neutrino. The stability of all three neutrinos was unexplainable in frames of Standard Model. But, in frames of Qmoger, the stability seems natural for the first generation of particles, produced by the background gravitons. The new scaling also predict EDM for neutrino or similar particles:

$$d_* = \hbar^{3/4} c^{1/4} \rho_0^{-1/4} \approx 5.8 \cdot 10^{-11} gram^{1/2} cm^{5/2} s^{-1}, \tag{6}$$

which is much bigger than indicated above EDM of graviton.

3. Discussion: brain stimulation by neutrinos

The situation with neutrinos is an example of interface between dark and ordinary matter (Idom), which was introduced in Ref. 10 in explanation of the phenomena of qualia (subjective experiences). The action potentials of neurons can create traps and coherent patterns in the background condensate

of the dipolar gravitons. The necessary for qualia huge number of degrees of freedom is supplied by the enormous concentration of gravitons (2).

The Compton wavelength of neutrino l_* is comparable with the size of neuron cluster, which is expected to be capable of producing sufficiently rich qualia. At the same time, l_* is comparable with the size of senile plague in the brain. Humans are continuously subjected to the neutrino showers from the sun and other cosmic sources [9]. Seemingly random jumps of our memory could be related to interaction with neutrinos. In any case, it will be interesting to study these interactions in a controlled laboratory setting by using artificial sources of neutrinos indicated in Ref. 9. The oscillating dipolar neutrinos with mentioned above attached rings of dipolar gravitons, potentially, can be a weapon against the senile plagues and a stimuli for the more flexible neurons. The possible gain, apart from the scientific inquire, is a new tool for healing and stimulation of the brain.

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