Research Essay

Quantum Model of Consciousness

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Abstract

In this paper, the new Schrodinger equation for brain waves is proposed and solved for quantum well with infinite boundaries. The spectra of the *alpha, beta theta delta and gamma* photons are calculated and agreement of the calculated spectra and EEG human brain is rather good. The width of the quantum well - source of the brain waves - is of the order of 10^{-6} nm, *i.e.*, is the order of the nucleus radius. The brain photons are emitted as quantum de-excitation of the quantum string, i.e. $\omega_n = \dfrac{E_n - E_0}{\hbar}$ where ω_n is the angular frequency of the brain photons with quantum number n and E_n are the n-excited state for $n=1,2,3,4,5$ respectively, and E_0 is ground state of the quantum string.

Keyword: consciousness, quantum string, brain waves, quantons.

1. Introduction

The ability of humans to perceive goes through a crucial change at present. More and more humans are able to notice fine-material energy fields and thus take up contact to other levels of our existence. The extended perception o belong the "Remote Viewing" techniques, a form of controlled extrasensory perception, which were developed by American military in the seventies under the pseudonym "Project stargate". It shows up that these remote viewing protocols - in the meantime published to a large extent - not only make possible the investigation of far objects, but also opens a gate to hidden realities in our "here and now", which we could prove by own experiments:

> With the same methods, human consciousness may move freely not only in space, but also in time. By our experiments we found that it is thereby even possible for humans to explore own earlier incarnations and to exceed the limits of personal perception - also in cosmic dimensions!

Therefore, in place of the too narrow seized term "Remote Viewing" we defined the new term "Refined Perception". It contains thereby not only a form of "seeing", but also other senses like feeling, radiesthetic phenomena like dowsing, and above all in addition, the perception with help of the human energy field, the aura.

Newest scientific research resulted in that humans can get into resonance with the earth and with other organisms via their different body-own electromagnetic fields. In this article thereby the electromagnetic waves produced by the human brain are our main field of interest.

The investigation of the earth resonance frequencies and/or the so-called Schumann waves is the key for the new scientific realizations. These are also well known in esoteric circles, however usually presented physically incorrect.

Nevertheless, Tesla Schumann waves will become already now increasingly important for all of us. These natural "magic chant" of the earth has a broad influence on our world climate, in addition, on the evolution of human consciousness, and they are for a long time subject of doubtful military technologies. For a long time we already know that the electrically positively loaded ionosphere forms a pole to the negatively charged earth's surface, and that between both constantly an electrical tension prevails. This tension unloads itself regularly, whenever on earth a thunderstorm takes place somewhere. Such a system of two concentric, opposite electrically charged balls in physics is called a ball condenser.

These physical characteristics of the ionosphere are used technically in the wireless information transfer. For radio waves, which are emitted from a transmitter on earth, the ionosphere works like an enormous hollow mirror. From this the radio waves will be reflected and in such a way transferred over large distances.

Everyone who tried once to hear a far radio station with a medium wave knows the effect that the receipt becomes clearly better after sunset. The reason is that the breakdown effects by the sun exposure to the ionosphere are then omitted.

These physical facts were described for the first time at the beginning of our century by the Croatian physicist and inventor Nikola Tesla, which accomplished at this time experiments for wireless transfer of energy at Colorado Springs.

Tesla produced at that time enormous electrical tensions of several for hundred thousand volts with his experimental assemblies, with which he could produce even artificial lightnings. He found out the fact that with every such lightning also radio waves of extremely low frequency are radiated, which can penetrate through and into the earth almost without resistance. Thus he had discovered the electromagnetic resonance frequency of the earth.

Tesla's work encountered at that time little approval, and because the economic use was not immediately foreseeable, also his backers withdrew themselves rapidly, so that he could not terminate his research work. Thus it took nearly a half century, until someone other encountered this effect - again more or less by coincidence.

It was in the year 1952. The German physicist Professor Dr. W. O. Schumann of the Technical University of Munich wanted to give his student exercises to the physics of electricity. Just at that time he worked with them on the computation of ball condensers. In order not to let it become too theoretical and abstract, Professor Schumann said to his students: "Imagine the ionosphere as the one ball and the earth's surface as the other ball. Calculate then, what will be the results.< Schumann had no idea, which value would result from this, and to be able to examine his students' work, himself took a pencil and a sheet of paper and made a rough calculation. He found a value of approximately 10 Hz. (Schumann,1952)

Again to the illustration: This value is the resonance frequency of the earth, thus the frequency, with which the earth begins to swing. Each energy discharge between ionosphere and earth's surface, thus each normal thunderbolt, produces radio waves of such a frequency, which are in resonance with the earth as by-product. They cannot therefore only penetrate into the earth, but at the same time accumulate whereby it comes to the formation of enormous standing waves, which may remain stable over long time.

Schumann himself at that time in no way knew about the consequences of his discovery. Nevertheless he published the result in a physical technical periodical.

After that, the Schumann frequency, as it is called today in honours of its discoverer, would probably land in the waste-paper basket of science history, but a physically interested physician coincidentally read the paper. He called to Schumann immediately, because for him - the physician - the hair stood to mountains, when he saw, what he read there. The Schumann frequency is also a resonance frequency of the human brain!

Measurements of the brain waves of humans with a, electrical encephalograph show that the brain produces electromagnetic waves, which lie in the range between 1 and 40 Hz. This spectrum is in medicine divided into four ranges, which accompany with different consciousness conditions:

1. Delta waves (1-3 Hz) are characteristic for dreamless deep sleep and koma conditions.

2. Theta waves (4-7 Hz) are characteristic for the dream sleep.

3. Alpha waves (8-12 Hz) arise in the relaxed awake condition, e. g. in a meditation or briefly before falling asleep and/or immediately after awaking.

4. Beta waves (13-40 Hz) are dominant in the normal awake condition.

The physician explained to Schumann that it was nevertheless a strange coincidence that earth and brain have homogeneous resonance frequencies, and so Schumann instructed his graduate student and later successor on its chair, Herbert Konig, to further investigate this.

Konig, who got also well-known from his scientific investigations about the dowsing phenomenon some years ago, accomplished now in the context of his doctor work extensive measurements of the earth resonance frequency and thereby naturally came to a more exact value than Schumann during his rough calculation. The accurate value of the Schumann frequency is 7.83 Hz.

Thus, it is finally clear that the agreement with the human brain frequencies is not coincidental, because this value corresponds accurately to the fundamental brain frequency of most mammals. For humans it lies scarcely at the lower limit of the alpha range, thus at the border between sleep and being awake. Is this the reason that animals have a less evolved consciousness comparing with man? Are they only at the threshold of higher consciousness?

The agreement between earth and brain frequency is indeed no coincidence, because animals and humans are children of the earth and their brain frequencies adapted quite easily to the natural conditions of their habitat in the process of the evolution.

It is well known in science that the brain reacts on electromagnetic frequencies which are offered to it from the outside if they are in the correct frequency range. This is a typical resonance effect. On this principle many of the mind machines are based, which should be helpful to achieve a relaxed, meditative condition, thus the alpha condition, where the calm waves of 8-12 Hz dominate and the restless thought activities of the normal beta condition stop.

Now the lowest, classical 7.83 Hz frequency is without any doubt the most intensive. But the higher form a spectrum of different oscillations, to which the brain is all together sensitive. The Schumann frequency spectrum is remarkably similar to that of the human brain, because similarly in EEG measurements the alpha and theta frequencies are characterized by far, high excursions, while the beta waves are flat and jerky. Thus the Schumann waves as a whole tend rather to calm down and wake up the human brain at the same time. The result might be a condition of brain synchronisation, which is momentarily still with difficulty conceivable for us.

Newest results of the brain research show that the old conception was too naive that the brain reconstructs offered frequencies simply from the outside, and does not describe the real procedures. Instead the brain reacts to outside energies and oscillations, to which it is sensitive, with an extensive reorganisation of its internal circuits. This leads - similarly as the decrease of the magnetic field - for a moment to a chaotic, stress-promoting unrest effect. Then, however, the

brain is inclined to organize itself on a higher oscillation level again. It achieves a higher consciousness condition, which is not explainable from the sum of the two single conditions.

This condition cannot only be described lapidary as brain synchronization how it is reached by meditation techniques like the tables of Chartres or certain tape cartridges. This higher consciousness condition is somewhat much more powerful. Perhaps one can describe it best as a condition, in which humans are awake and asleep at the same time, and the normal daily consciousness with the ability for critical, free decision and the immeasurable possibilities of the subconsciousness are available at the same time. In this condition human consciousness transcends the fourth dimension - man becomes the master of time. There is - at least in our culture - at present only one consciousness condition, in which this is realized. It concerns the so-called lucid dream. Normally awake consciousness is more or less switched off during a usual dream, what is also recognizable by the fact it that in the dream condition the theta and alpha waves dominate. Men are therefore predominantly passive in their dreams and let the dream action evolve itself.

Criticism ability is to a large extent suppressed, so that also the bizarre realities, which one meets usually in dreams, are not noticed during the dream. This essentially corresponds to the consciousness condition of "dream time" in former times, in which humans were more or less delivered to external influences also in their daily life and were able only to react. They could nevertheless survive - similarly as the animals -, since they were integrated part of the total structure of nature. Quite simply the consciousness of the free will was missing to them, which could enable them to revolt.

In daily consciousness against it our rational understanding dominates, which lets us meet critical and self-conscious decisions. On the other hand the immeasurable creative forces of the unconscious are now in the background - forces, which permit us to create whole realities in our dreams. Also this limits our scope of action, because our awake understanding is not able to seize and control nature in their entireness. Our rational understanding is inclined to define itself and so the wisdom of the unconscious, the feeling of belonging to a larger entireness is missing. In the condition of the lucid dream these two contrasts are bridged. One become conscious during the dream of the fact that he dreams, and so on one hand knows that the reality, which he experiences, was created totally by himself. The creative forces of the unconscious are fully at his disposal. On the other hand also his critical understanding is active, so that his ability to self-conscious acting is available too.

Thus the lowest Schumann frequency is not today already any longer with those 7.83 Hz, g in the fifties, but over far distances of the year already in the proximity of the "magical" border of 8 Hz, sometimes even higher. We called this border >magical<, because it represents exactly the transition from the theta to the alpha frequencies. Only in such moments it be will possible to let the consciousness-extending effect of the Schumann resonance spectrum as a whole become

fully effectively because the sleep- inducing, i.e. consciousness-clouding effect of the theta waves is void. The highest frequency values occur thereby in the summer months (of the Northern Hemisphere), while they drop down again in winter. The trend is still confirmed by investigations of the second and third Schumann resonance frequencies. Here the seasonal fluctuations are to be observed even more strongly. They move between 13,8 and 14,1 Hz resp. between 19,5 and 20,3 Hz.

What does this mean for our consciousness? Research over unusual consciousness conditions, as for instance the psychologist documents Michael Murphy performed, points out that for example shamans or Indian fakirs reach the most pronounced metanormal abilities in conditions, which one cannot describe with the usual term "trance", what we mostly understand as a sleep-similar condition of lowered consciousness. Rather it concerns a feeling of increased awakeness, thus a condition of the excitation or ecstase, that is characterized in the EEG rather by the higher beta frequencies above 20 Hz. (Chand, 2009)

If due to the climatic changes on earth the natural spectrum of the Schumann waves would thus expose us on the one hand a constantly with intensifying alpha frequency, on the other hand however a likewise ever more intensively becoming beta wave spectrum, which is appropriate to a large extent above 20 Hz, then this would mean that we are all going towards a condition of increased awakeness. This is strengthened still, as we see, by the continuous decrease of the earth's magnetic field.

If we see, however, these effects as a whole, then we will feel this consciousness condition no longer as stress or will become sick. The reassuring alpha waves take care about this, which have the largest intensity in the Schumann wave spectrum. It might be very more balanced rather, positive consciousness condition. Since it does not concern however a pure alpha condition, we will not be in danger of increased manipulations Everything points thus on that regardless of all global dangers mankind steers on a new age of higher consciousness, not from own drive, but steered by the "charm singing" of the earth. Did the old prophecies be wrong? In the opposite - we will see that in 2000 years old writings this development was already foreseen accurately!

2. Quantum reality

Can a quantum effects be seen? The plain answer is no, of course: by definition, quantum superpositions are what exist prior to measurement. As soon as a measurement is made, the rules dictate that one particular result out of the range of possible results must be obtained, so that the simultaneous presence of two different states can never be directly demonstrated. As always, the mysterious, inscrutable parts of quantum mechanics remain hidden from our eyes (which is why they are mysterious and inscrutable: if quantum superpositions were to be found in the world of

our senses, we would long ago have developed a language for them, and would not find them unfamiliar).

We can, nevertheless, see the effects or consequences of quantum superpositions. The two-slit experiment remains the prime example: a single photon somehow passing through a two-slit apparatus creates an interference pattern in a way that a strictly locatable classical particle could not possibly do. If you insist on saying, in particle language, that the photon must go through one slit or the other, you can't understand the interference pattern, which in wave terms requires that some contribution comes from each slit. It's only by accepting the idea of the superposition of states, in which there are coexisting pieces of wave function describing photons that go through both slits, that you can begin to understand how interference in such a case can happen. But at the same time you have to be wary of imagining that the parts of the wave function associated with each slit have anything to do with actual photons going through actual slits—things get tricky, as we have seen, as soon as you start imputing a traditional degree of reality to these equipresent bits and pieces of wavefunction.

These familiar examples of superposition—the two-slit experiment, electrons prior to spin measurement, or photons prior to a polarization measurement—apply to single objects, individual quantum creatures. Can large systems—ones composed of lots of photons, electron, or atoms—behave in the same way? Not easily, it turns out, but there's at least one reputable and instructive example.

The example comes from certain kinds of superconducting devices, which when cooled to suitably low temperatures conduct electricity without any resistance. An electric current set up in a ring of superconducting material will flow around and around forever, without loss. Because of resistance, an electric current set up in a ring of copper wire, for example, will come to a halt almost the instant the motive power is turned off

This isn't the place to discuss in any detail the complex and demanding theory of superconductivity, which wasn't put together until almost half a century after the phenomenon itself was first discovered, back in 1911. All we need to know here is that the electrons in a superconductor move in a coherent fashion. In both an ordinary copper wire and a superconductor, electric current amounts to a collective flow of electrons, but in a copper wire, the electrons jostle about like a huge crowd trying to follow a parade down narrow streets. They bump up against the copper atoms of the wire and each other, and the incessant jostling and obstructing and diversion amount to a resistance to the flow. It takes effort—in the form of a voltage applied to the wire—to keep all the electrons moving along.

But in a superconductor, the electrons abandon all sense of individual identity and purpose, and move as one. It's not that every electron is doing the same thing as every other electron, but that they all move in a coherent fashion. A human example of such coherence is the wave that crowds

perform at a baseball game. If everyone in the stadium stands up and sits down at random, all you'll see is confusion, but when everyone harmonizes their motion, a wave appears to travel around the stands. An interesting phenomenon occurs here: as one person, at one place in the crowd, is standing up, another person, perhaps on the opposite side of the stadium, is sitting down. As the wave moves around, you could spot any number of such pairs of people whose up-and-down motions are exactly harmonized. The electrons in a superconductor behave something like this. They 'ink up in pairs, not in the sense of being physically linked, but n the sense that their motions are coupled even though the electrons are a long way apart.

Quantum mechanically, the upshot of this harmony is that all e electron pairs in a superconductor are described by the same wave function (all the pairs of people in the baseball doing the same thing, conducting ring, something else happens: because all the electron pairs follow a single wave function, that wave function has to wrap around on itself in the ring without any abrupt change. Among the implications of this wave function continuity is that any magnetic field passing through the interior loop, connected as it is to the current flowing around the loop, becomes "quantized," meaning that it can take on only certain discrete values.

It's not too difficult, these days, to make a superconducting ring centimeters or more across, and yet even this large an object should, if quantum theory is correct, be correctly described as a single quantum system characterized by the current flowing through it and the magnetic field trapped inside it. Even though it's a large, compound object, with an electric current and magnetic field that arise from the motion of countless electrons, it is, or should be, a single quantum system, just as an individual electron or photon is a single quantum object.

An unbroken ring, once set up, will carry current forever. It remains, in other words, in a fixed quantum state. A more interesting state of affairs can be created by putting a small gap somewhere in the ring, so that the electrical circuit is not quite a full circle but has a slightly resistive "weak link" somewhere along its circumference. As long as the gap is narrow, the superconducting current will continue to flow, being able in effect to jump across the gap. But the presence of the gap allows, roughly speaking, the magnetic field threading the ring to come and go a little; it is no longer strictly confined, and additional increments of magnetic field can jump into the ring, through the gap, or out of it the same way. Now we have a quantum system, characterized by a certain intensity of magnetic field, that can jump from one state to another.

Difficult and elaborate experiments have been performed in the last few years in which the imposition of an external magnetic field is used to control the stability of the individual quantum states of the ring, and to influence the ease with which it can jump from one state to another. The system does indeed jump in the manner prescribed by quantum mechanics, and certain sophisticated results can be obtained which indicate magnetic field can exist in a genuinely superposed state the simultaneous presence of different magnetic states of the ring.

Of course, these superpositions, as we said at the outset, cannot directly demonstrated, because any measurement of the magnetic state forces it to adopt one specific value or another . Rather, certain measurements of other properties of the ring which don't interfere with its magnetic state, are consistent with the existence of a superposition of magnetic states the ring.

In short, everything works the way quantum mechanics says do work. What does this tell us? Mainly, that in this one at least it is possible to have a macroscopic system that the rules of quantum mechanics. That's an important ion, because it had been thought from time to time that the way of escaping the measurement problem would be to : macroscopic systems, as opposed to individual quantum would not obey the elementary rules of quantum lies, and so could not sustain superposed states. The inducting ring is a counterexample to that hypothesis: it's definitely a macroscopic system, but it evidently behaves just as quantum theory predicts. You can't get around the measurement problem by supposing that for some reason big objects and systems obey a different set of rules.

You, might say that the traditional two-slit experiment is a :optic demonstration of the correctness of quantum mechanics since one ends up with a large apparatus and a result—the appearance of an interference pattern—that's easily visible to the naked eye But in two-slit experiment, the fundamental quantum object is the individual photon going through the apparatus, whereas in the superconducting ring, the quantum states represent collective motions of trillions of individual electrons pair acting together.

In short, it's not the case that just putting together a lot of individual quantum objects necessarily erases quantum behavior. On the other hand, a superconductor is an exquisitely special and unusual creature, and electrons in large systems generally don't get along so well together. If it's true that superconductors exhibit large-scale quantum behavior only because of the very special conditions under which they exist, then perhaps we should ask in what way ordinary, non-superconducting systems are different, and if that difference has anything to do with why, for the most part, they do not apparently show quantum behavior

3. Modified Schrödinger Equation

In paper (Kozlowski, Marciak-Kozlowski, 2010) the new Schrodinger equations for brain was proposed

$$i\hbar \frac{\partial \Psi}{\partial t} = -\frac{\hbar^2}{2m_i}\nabla^2\Psi + V\Psi - \frac{\hbar^2}{2M_p}\nabla^2\Psi$$
$$+ \frac{\hbar^2}{2M_p}\nabla^2\Psi - \frac{\hbar^2}{2M_p c^2}\frac{\partial^2\Psi}{\partial t^2}. \tag{1}$$

In formula (1) M_p is the Planck mass, m_i is the mass of the particle. In paper (Kozlowski, Marciak-Kozlowska, 2010) the new interpretation of the equation (1) was discovered. We argue that the $\Psi(x, y, z, t)$ represents the state of consciousness presumably the Bohm function, which fulfils the wave equation

$$\frac{\hbar^2}{2M_p}\nabla^2\Psi - \frac{\hbar^2}{2M_p c^2}\frac{\partial^2\Psi}{\partial t^2} = 0, \tag{2}$$

i.e. $\Psi(x, y, z, t)$ is the Bohm pilot wave. For $M_p \neq 0$ Eq. (2) can be written as

$$\nabla^2\Psi - \frac{1}{c^2}\frac{\partial^2\Psi}{\partial t^2} = 0. \tag{3}$$

It is interesting to observe that pilot brain wave Ψ does not depend on the mass of the particle. With postulate (3) we obtain from equation (1)

$$i\hbar\frac{\partial\Psi}{\partial t} = -\frac{\hbar^2}{2m_i}\nabla^2\Psi + V\Psi - \frac{\hbar^2}{2M_p}\nabla^2\Psi \tag{4}$$

and simultaneously

$$\frac{\hbar^2}{2M_p}\nabla^2\Psi - \frac{\hbar^2}{2M_p c^2}\frac{\partial^2\Psi}{\partial t^2} = 0. \tag{5}$$

In the operator form Eq. (5) can be written as

$$\hat{E} = \frac{\hat{p}^2}{2m_i} + \frac{1}{2M_p c^2}\hat{E}^2, \tag{6}$$

where $\hat{E}$ and $\hat{p}$ denote the operators for energy and momentum of the particle with mass m_i. Equation (31) is the new dispersion relation for quantum particle with mass m_i. From Eq. (21) one can concludes that Schrödinger quantum mechanics is valid for particles with mass $m_i \ll M_P$. But pilot wave exists independent of the mass of the particles.

For particles with mass $m_i \ll M_P$, Eq. (5) has the form

$$i\hbar\frac{\partial\Psi}{\partial t} = -\frac{\hbar^2}{2m_i}\nabla^2\Psi + V\Psi. \tag{7}$$

Equation (8) is the standard Schrodinger equation for quantum phenomena.

In the case when $m_i \approx M_p$ Eq. (5) can be written as

$$i\hbar \frac{\partial \Psi}{\partial t} = -\frac{\hbar^2}{2M_p} \nabla^2 \Psi + V\Psi, \tag{8}$$

but considering Eq. (4) one obtains

$$i\hbar \frac{\partial \Psi}{\partial t} = -\frac{\hbar^2}{2M_p c^2} \frac{\partial^2 \Psi}{\partial t^2} + V\Psi \tag{9}$$

or

$$\frac{\hbar^2}{2M_p c^2} \frac{\partial^2 \Psi}{\partial t^2} + i\hbar \frac{\partial \Psi}{\partial t} - V\Psi = 0. \tag{10}$$

4. Gravity and Schrödinger Equation: Tesla-Schumann waves

Recently, the growing interest of the Tesla-Schumann resonances. It is well known that the frequencies of the Tesla-Schumann resonances have the same values as the human brain waves. In this paragraph we will discuss the influence of the gravity on the function $\Psi(x, y, z, t)$

Classically, when the inertial mass m_i and the gravitational mass m_g are equated the mass drops out of Newton's equation of motion, implying that particles of different mass with the same initial condition follows the same trajectories. But in Schrödinger's equation the masses do not cancel. For example in a uniform gravitational field

$$i\hbar \frac{\partial \Psi}{\partial t} = -\frac{\hbar^2}{2m_i} \frac{\partial^2 \Psi}{\partial x^2} + m_g g x \Psi \tag{12}$$

implying mass dependent difference in motion.

In this paragraph we investigate the motion of particle with inertial mass m_i in the potential field *V*. The potential *V* contains all the possible interactions including the gravity.

$$i\hbar \frac{\partial \Psi}{\partial t} = V\Psi - \frac{\hbar^2}{2m_i} \nabla^2 \Psi - 2\tau\hbar \frac{\partial^2 \Psi}{\partial t^2} \tag{13}$$

where the term

$$2\tau\hbar \frac{\partial^2 \Psi}{\partial t^2}, \quad \tau = \frac{\hbar}{m_i c^2} \tag{14}$$

describes the memory of the particle with mass m_i. Above equation for the wave function Ψ is the local equation with finite invariant speed, c which equals the light speed in the vacuum.

Let us look for the solution of the Eq. (13), $V=0$, in the form (for 1D)

$$\Psi = \Psi(x-ct). \tag{15}$$

For $\tau \neq 0$, i.e. for finite Planck mass we obtain:

$$\Psi(x-ct) = \exp\left(\frac{2\mu ic}{\hbar}(x-ct)\right) \tag{16}$$

where the reduced μ mass equals

$$\mu = \frac{m_i M_p}{m_i + M_p} \tag{17}$$

For $m_i \ll M_p$, i.e. for all elementary particles one obtains

$$\mu = m_i \tag{18}$$

and formula (16) describes the wave function for free Schrödinger particles

$$\Psi(x-ct) = \exp\left(\frac{2m_i ic}{\hbar}(x-ct)\right) \tag{19}$$

For $m_i \gg M_p$, $\mu = M_p$

$$\Psi(x-ct) = \exp\left(\frac{2M_p ic}{\hbar}(x-ct)\right) \tag{20}$$

From formula (19 we conclude that $\Psi(x-ct)$ is independent of mass m_i. In the case $m_i < M_p$ from formulae (19) and (20) one obtains

$$\mu = m_i\left(1 - \frac{m_i}{M_p}\right)$$
$$\Psi(x-ct) = \exp\left(\frac{2im_i c}{\hbar}(x-ct)\right)\exp\left(-i\frac{m_i}{M_p}\left(\frac{2m_i c}{\hbar}x - \frac{2m_i c^2}{\hbar}t\right)\right) \tag{21}$$

In formula (21) we put

$$k = \frac{2m_i c}{\hbar}$$

(22)

$$\omega = \frac{2m_i c^2}{\hbar}$$

and obtain

$$\Psi(x - ct) = e^{i(kx - \omega t)} e^{-i\frac{m_i}{M_p}(kx - \omega t)}$$

(22)

As can concluded from formula (22) the second term depends on the gravity

$$\exp\left[-i\frac{m_i}{M_p}(kx - \omega t)\right] = \exp\left[-i\left(\frac{m_i^2 G}{\hbar c}\right)^{1/2}(kx - \omega t)\right]$$

(23)

where G is the Newton gravity constant. Formula (22) fescribes the influence of the gravity on stte of the consciousness

It is interesting to observe that the new constant, α_G,

$$\alpha_G = \frac{m_i^2 G}{\hbar c}$$

(24)

is the gravitational constant. For $m_i = m_N$ nucleon mass

$$\alpha_G = 5.9042 \cdot 10^{-39}$$

(25)

5. The Particle in a Box

In paper (to be published)) the quantum model of the consciousness waves was proposed. It was shown that instead of waves *alpha, beta, theta, delta, gamma* we can say about *quantons alpha, beta, gamma, delta, theta.* In this paragraph we consider the simplest model for the emission of quantons

We consider quantum mechanical system for a particle of mass m_i confined in a one-dimensional box of length *L and infinite walls*. For the particle to be confined within region II, the potential energy outside (regions I and III) is assumed to be infinite. In order to understand further this system, we need to formulate and solve the Schrödinger equations (26).

$$i\hbar \frac{\partial \Psi}{\partial t} = -\frac{\hbar^2}{2m_i}\nabla^2 \Psi + V\Psi - \frac{\hbar^2}{2M_p}\nabla^2 \Psi + \frac{\hbar^2}{2M_p}\left(\nabla^2 \Psi - \frac{1}{c^2}\frac{\partial^2 \Psi}{\partial t^2}\right).$$

(26)

Considering the pilot wave equation

$$\nabla^2\Psi - \frac{1}{c^2}\frac{\partial^2\Psi}{\partial t^2} = 0 \tag{27}$$

one obtains

$$i\hbar\frac{\partial\Psi}{\partial t} = -\frac{\hbar^2}{2\mu}\nabla^2\Psi + V\Psi, \tag{28}$$

where

$$\mu = \frac{m_i M_p}{m_i + M_p}.$$

In region II, $V(x) = 0$ In regions I and III, $V(x) = \infty$

$$-\frac{\hbar^2}{2\mu}\nabla^2\Psi + V\Psi = E\Psi \qquad -\frac{\hbar^2}{2\mu}\nabla^2\Psi + V\Psi = E\Psi$$

$$-\frac{\hbar^2}{2\mu}\nabla^2\Psi + 0 = E\Psi \qquad -\frac{\hbar^2}{2\mu}\nabla^2\Psi + \infty\Psi = E\Psi \tag{28}$$

$$-\frac{\hbar^2}{2\mu}\nabla^2\Psi = E\Psi \qquad -\frac{\hbar^2}{2\mu}\nabla^2\Psi = (E - \infty)\Psi$$

For regions I and III (outside the box), the solution is straightforward, the wavefunction Ψ is zero.

For region II (inside the box), we need to find a function that regenerates itself after taking its second derivative.

$$-\frac{\hbar^2}{2\mu}\nabla^2\Psi = E\Psi$$

$$\nabla^2\Psi = \frac{2\mu E}{\hbar^2}\Psi = -k^2\Psi, \quad \text{where we define } k = \sqrt{\frac{2\mu E}{\hbar^2}}. \tag{29}$$

Perfect candidates would be the trigonometric sine and cosine functions.

$$\Psi(x) = A\cos(kx) + B\sin(kx). \tag{30}$$

To further refine the wave function, we need to impose boundary conditions: At *x=0*, the wave function should be zero.

$$\Psi(0) = A\cos(k0) + B\sin(k0) = A\cdot 1 + B\cdot 0. \tag{31}$$

Equation can only be true if $A = 0$: $\Psi(x) = B\sin(kx)$.

In addition, at $x=L$, the wave function should also be zero.

$$\Psi(0) = 0 = B\sin(kL). \quad \text{True when } kL = n\pi \text{ or } k = \frac{n\pi}{L}:$$

$$\Psi(x) = B\sin(\frac{n\pi}{L}x), \quad n = 1, 2, 3, \ldots \tag{32}$$

Going back to the Schrödinger's equation, we can then formulate the energies

$$kL = n\pi \quad \text{and} \quad k = \sqrt{\frac{2\mu E}{\hbar^2}}$$

$$\sqrt{\frac{2\mu E}{\hbar^2}} = \frac{n\pi}{L} \quad \Rightarrow \quad \frac{2\mu E}{\hbar^2} = \frac{n^2\pi^2}{L^2} \tag{34}$$

$$E_n = \frac{n^2\pi^2\hbar^2}{2\mu L^2} = \frac{n^2 h^2}{8\mu L^2} \quad \text{since } \hbar = \frac{h}{2\pi}.$$

Thus, the application of the Schrödinger equation to this problem results in the well-known expressions for the wave functions and energies, namely:

$$\Psi_n = \sqrt{\frac{2}{L}}\sin\left(\frac{n\pi x}{L}\right) \text{ and } E_n = \frac{n^2 h^2}{8\mu L^2}. \tag{35}$$

From formula (60) we conclude that for "heavy" classical particles, i.e. for $m_i \gg M_p$ energy spectrum of the particle in the box is independent of the mass of particle

$$E_n = \frac{n^2 h^2}{8M_p L^2}. \tag{36}$$

In paper (Marciak-Kozłowska, Kozłowski, 2010) we argue that formula (36) describes the quantum states of the consciousness. The energy of the quanta of the consciousness is of the order of 10^{-15} eV .Substituting 10^{-15} eV for E_n to formula (16) and considering the mass of M_p $=10^{31}$ eV we obtain for the characteristic length, L , the value 10^{-6} nm., i.e. lower that the *nanotubule.*. With $L=10^{-6}$ nm we obtain from formula (36) the following spectrum for brain waves

$$E_n - E_0 = 7x10^{-15}, 2.8x10^{-15}, 6.3x10^{-14}, 1.1x10^{-13}, 1.7x10^{-13}\,eV \tag{37}$$

for n=1,2,3,3,5 respectively.

The brain photons are emitted as quantum deexcitation in the quantum well, i.e. $\omega_n = \dfrac{E_n - E_0}{\hbar}$

where ω_n is the angular frequency of the brain photons with quantum number n and $E_n.E_0$ are the n-excited state for $n=1,2,3,4,5$ respectively, and E_0 is ground state of the quantum well with energy equals zero. . In Table 1 the comparison of the measured (EEG) and calculated spectra are presented . The agreement is rather good

Table 1 Comparison of the measured (EEG) and calculated brain photons spectra

Measured enegies , EEG(eV)	Model calculation EEG(eV)
7×10^{-15}	7×10^{-15}
1.7×10^{-14}	2.8×10^{-14}
3.4×10^{-14}	6.3×10^{-14}
7.0×10^{-14}	1.1×10^{-13}
1.4×10^{-13}	1.7×10^{-13}

5. Conclusions

In this paper, we put forward the quantization of the brain waves. We propose the theoretical model: the well with infinite walls for the calculations of the brain photons (*quantons*) spectra. The model is free of additional parameters. By comparison to the measured EEG spectra we obtain the width (dimension of the well,) $L=10^{-6}$ *nm*. With value of L we can calculate the whole spectrum of the brain pulsation. It is well known that frequencies ν (energies $\hbar\omega$) of the brain photons are nearly equal to the frequencies of the Tesla-Schumann waves. The Tesla-Schumann waves are the resonances in Earth- ionosphere cavity) . In the paper we investigate the influence of the gravitation on the brain pulsations and obtain the wave functions for gravity dependent brain waves. The connections of the lighting , the Tesla-Schumann resonances and brain waves can be supported by the observation that the primordial charge channel for lighting has the thickness of the order of 10^{-6} nm is of the order of the radius of atomic nucleus.

The calculations of the brain waves frequencies are based on the existence of the strand of the medium –the strand of the 10^{19} protons with width of the order of 10-15 m and length of the 10^4km- the string of the consciousness. The vibration of this string produces the brain waves. The energies of the brain waves are the energies of the standing waves of the consciousness string.

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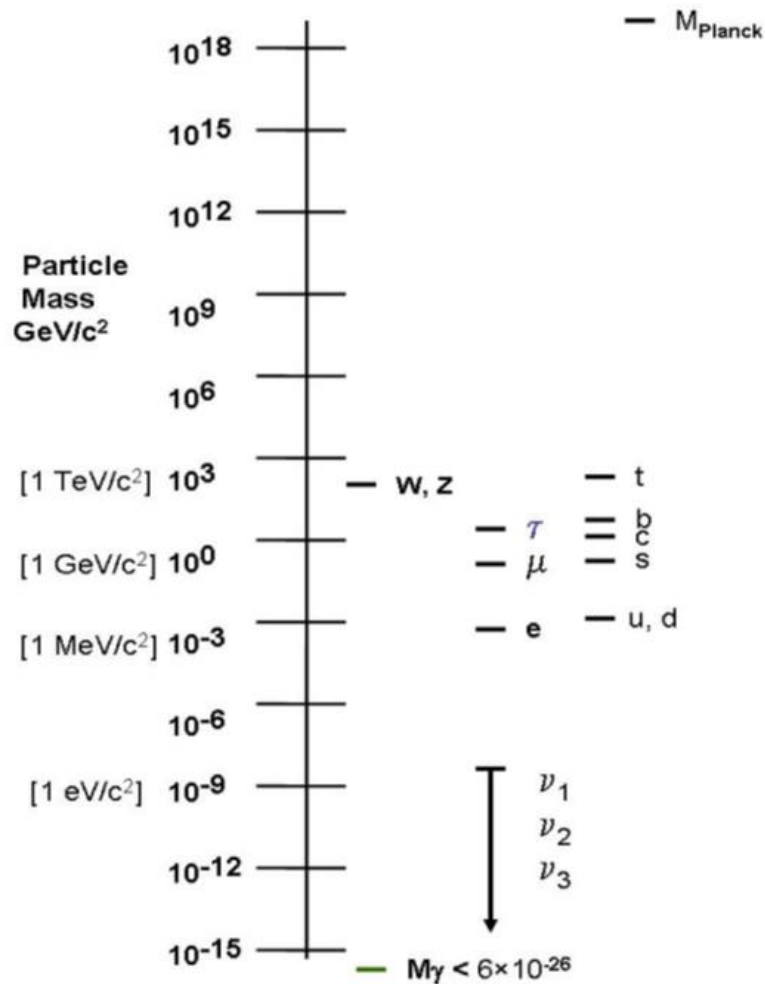
Fig.1 Energy 10^{-15} eV= Energy of the brain quantons