Exploration

On the *Aeons* & Consciousness

Janina Marciak-Kozłowska[1] & Miroslaw Kozlowski[*2]

[1]Institute of Electron Technology, Warsaw, Poland
[2]Warsaw University, Warsaw, Poland

Abstract

In a series of papers, Roger Penrose formulated a new theory for the beginning the Universe. The Conformal Cycle Cosmology (CCC) generalized the Einstein General Relativity Theory. In this paper, we argue that the CCC offers the deeper study of consciousness phenomenon. The super high energy burst in previous *Aeon* can initiated consciousness energy (binding energy) in human brain in the present *Aeon*.

Keywords: Aeons, binding energy, human brain.

1. Introduction

In this paper, the CB photons spectra and human brain photons are calculated on the same footing. It is obvious that consciousness is not located in space. According to *special relativity* theory all physically observed phenomena are located in 4D space-time. The consciousness not exist in time also, is *timeless*. The brain photons are the effect of the interaction of the timeless consciousness with human brain. The final results of this interaction are*: alpha, beta, delta and theta* waves.

In this paper, we calculated the temperature of the source of the photons located in human brain. It is well known that our space-time is filled with Cosmic Background Radiation. It was interesting to calculate the temperature of the CBR source with the same model as for brain photons. As the result, the shape of temperature is calculated and temperature T=2.53 K was obtained. This temperature is in very good agreement with observed value.

One may conclude by analogy that our space with background radiation was created in the interaction of the timeless conscious with void. In the paper [Kozlowski M. Marciak-Kozlowska J, 2017], we calculated the binding energy of the brain. In this paper, we argue that binding energy is the trace of energy burst in previous Aeon.

* Correspondence: Miroslaw Kozlowski, Prof. Emeritus, Warsaw University, Poland. Email: m.kozlowski934@upcpoczta.pl

2. Conformal Cyclic Cosmology

A scientific world-view which does not profoundly come to terms with the problem of conscious minds can have no serious pretensions of completeness. Consciousness is part of our universe, so any physical theory which makes no proper place for it falls fundamentally short of providing a genuine description of the world. I would maintain that there is yet no physical, biological, or computational theory that comes very close to explaining our consciousness

Roger Penrose

According to Roger Penrose conformal cyclic cosmology (CCC) [Penrose, 2008, 2009, 2010], what would normally be regarded as a probable entire history of our universe, starting with its Big Bang and ending with its accelerating de Sitter-like expansion (assuming a positive cosmological constant Λ [Einstein,1917], is taken to be but one *aeon* in a (perhaps unending) succession of such aeons, where the conformal 3- surface B representing the big bang of each aeon is regarded as the conformal continuation of the remote future (i.e. conformal infinity $\mathbf{I}$ [Penrose, 1963, 2004]) of the previous one. CCC takes there to be *no* inflationary phase in any aeon, the observational support that inflation enjoys being supposed to be equally supported by the existence of the final exponential expansion occurring in the previous Aeon [Penrose, 2004].

The clearest observational signal of CCC results from numerous supermassive black-hole encounters occurring within clusters of galaxies in the aeon previous to ours. These encounters should yield huge energy releases in the form of gravitational radiation bursts. From the perspective of our own A eon (see [Penrose, 2010], these would appear *not* in the form of gravitational waves, but as spherical, largely isotropic, impulsive bursts of energy in the initial material in the universe, which we take to be some primordial form of dark matter, the impulse moving outwards with the speed of light up to our last- scattering surface.

The effect of such an energy burst would be to provide an outward kick to this initial material of the early universe. The kick will be much more energetic than the normal local variations in temperature in the early Big Bang. Accordingly, the outward (almost impulsive) burst would have, proportionally, a rather closely uniform intensity over the whole outward-moving sphere, in this material. This sphere is seen as a *circle* from our present vantage point, as it intersects our past light cone (where account might need to be taken of a certain amount of distortion of this circle due to inhomegeneities in the mass distribution in either aeon). The energy variations over the sphere would be of the order of the general

temperature variations that we see in the CMB, at the last scattering surface, but this now sits on the edge of the far larger energy pulse. We do not see this energy pulse directly (although in principle we could, if it headed directly towards us, which could be the case only for a perceived circle of zero radius). What we see would be the scattered radiation as the pulse encounters further material in the early universe. The effect may be compared with what happens when a supernova burst encounters a cloud of gas.

The intensity of this would be a matter of detailed considerations not discussed in this paper. But the key point is that what is seen would represent only a small fraction of the energy in the burst, and its variance over the perceived circle would, in absolute terms, be only some tiny fraction in the initial fluctuation that we see in the CMB overall because of this reduced proportion. Moreover the intensity that we see, in this small fraction, could appear to us as warmer than the average or lower than average, depending on the details. As viewed from the perspective of our present location in space-time, the most immediately distinctive effect on the CMB of this energy burst would be a circular (or annular) region, perhaps slightly distorted, over which the temperature *variance* would be anomalously low.

A further point, of considerable diagnostic relevance, would be the fact that such events ought to repeat themselves several times, if CCC is correct, with the centre of each circle remaining at almost exactly the same point in the CMB sky. This is to be expected because such black-hole encounters would be likely to occur many times in the entire history of a single supermassive black hole. Moreover, there might be more than one such black hole within the same galactic cluster, and an entire cluster, if it remains bound in its remote future, would converge on a single point of the **I** of the previous Aeon, in the CCC picture, and this would appear as a single point in our CMB sky. That point, therefore, would be the centre of a family of concentric circles of anomalously low variance in its CMB temperature, with fairly randomly different radii. We might expect, in some cases—perhaps on account of an eventually chaotic gravitational dynamics—that the galactic cluster might instead end up as several distinct ultimately bound portions separating from each other according to the exponential expansion of the later phases of this earlier aeon. In such situations, the different portions, if each remains bound, would converge on separate but close points on **I**. If black-hole encounters occur within each separate portion of the cluster, this would lead to independent (overlapping) families of circles of anomalously low temperature variance, with slightly separated centres. These pictures are implicit in

the claimed predictions of CCC [Penrose, 2008, 2009, 2010], although not previously fully spelled out, and the existence or otherwise of such concentric rings represents a powerful observational test of CCC.

3. Consciousness and Quantum Theory

The issue of observation in QM is central, in the sense that objective reality cannot be disentangled from the act of observation, as the Copenhagen Interpretation (CI) nearly states in the words of John A. Wheeler 1981, we live in an observer-participatory Universe. The vast majority of today's practicing physicists follow CI's practical prescriptions for quantum phenomena, while still clinging to classical beliefs in observer-independent local, external reality). There is a critical gap between practice and underlying theory. In his Nobel Prize speech of 1932, Werner Heisenberg concluded that the atom "*has no immediate and direct physical properties at all*." If the universe's basic building block isn't physical, then the same must hold true in some way for the whole. The universe was doing a vanishing act in Heisenberg's day, and it certainly hasn't become more solid since (Schild, 2012).

This discrepancy between practice and theory must be confronted, because the consequences for the nature of reality are far-reaching an impressive body of evidence has been building to suggest that reality is non-local and undivided. Nonlocality is already a basic fact of nature, first implied by the Einstein-Podolsky-Rosen thought experiment despite the original intent to refute it, and later explicitly formulated in Bell's Theorem.

Moreover, this is a reality where the mindful acts of observation play a crucial role at every level. Heisenberg again: "*The atoms or elementary particles themselves. . . form a world of potentialities or possibilities rather than one of things or facts."* He was led to a radical conclusion that underlies our own view in this paper: *"What we observe is not nature itself, but nature exposed to our method of questioning*." Reality, it seems, shifts according to the observer's conscious intent. There is no doubt that the original CI was subjective (Schild, 2012).

Quantum theory is not about the nature of reality, even though quantum physicists act as if that is the case. To escape philosophical complications, the original CI was pragmatic: it concerned itself with the epistemology of quantum world (how we experience quantum

phenomena), leaving aside ontological questions about the ultimate nature of reality. The practical bent of CI should be kept in mind, particularly as there is a tendency on the part of many good physicists to slip back into issues that cannot be tested and therefore run counter to the basic tenets of scientific methodology.

4. The Model

In order to put forward the theory of the brain waves, we quantize the brain wave field. In the model (Marciak-Kozlowska and Kozlowski, 2012) we assume that:

(i) The brain is the thermal source in local equilibrium with temperature T.

(ii) The spectrum of the brain waves is quantized according to formula $E = h\nu$ where E is the photon energy in eV, $\hbar$ =Planck constant, ν -is the frequency in Hz.

(iii) The number of photons emitted by brain is proportional to the (amplitude)^2 as for classical waves. The energies of the photons are the maximum values of energies of waves for the emission of black body brain waves we propose the well know formula for the black body radiation (Baierlein, 1998).

The energy density within a blackbody is independent of the material from which the blackbody is made. We will assume that this thermodynamic law holds as well for neutrino emitters as for photon emitters. This thermodynamic relation greatly simplifies the task of calculating the energy density. The standard technique is to make the blackbody out of *nothing*. Enclosure walls at a temperature T are used to surround a vacuum. Emission from the walls fills the vacuum to the energy density required of a black-body at the wall temperature. The energy *density per* unit volume and per unit frequency range is then calculated. The number of modes per unit volume and frequency is most easily obtained by assuming a rectangular enclosure of smooth, almost perfectly reflecting walls. A minute amount of absorption is necessary to insure that the walls and radiation are in thermal contact. This situation is easy to achieve experimentally for photons.

A spatial mode of the field is simply a particular space pattern that satisfies a particular boundary condition, for example, for our case the field is zero at the wall. In the standard technique, an integral number of half wavelengths must fit between opposite walls in one direction. Counting the number of spatial three-dimensional modes per unit volume and frequency is then standard and gives $4\pi\nu^2 c^{-3}$ for any wave field satisfying the boundary

conditions. The actual modes present for a particular wave-field will be larger than the space count because each space mode may harbor a number of internally different fields. Since photons come in two circular polarizations (left and right handed we have N=2 ($4\pi\nu^2 c^{-3}$) for photons.

In thermodynamics we consider Planck type formula for probability for the emission of the particle (photons as well as particles with m ≠0) with energy (E, E+dE)) by unit energy by the source with temperature T is equal to

$$\rho = \left(\frac{8\pi\nu^2}{c^3}\right)\frac{1}{Exp\left(\frac{h\nu}{kT}\right)-1} \qquad (1)$$

For very low temperature, i.e., for

$$\frac{h\nu}{kT} \gg 1 \qquad (2)$$

From formula (1) we obtain for probability emission ρ

$$\rho = \left(\frac{8\pi\nu^2}{c^3}\right)Exp\left(\frac{-h\nu}{kT}\right) \qquad (3)$$

Formula (3) is black body emission formula (Planck formula) for the vacuum emission. For the emission into surrounding matter we modify formula (3) as

$$P(E)dE = BE^2\, e^{(-E/kT)}\, dE \qquad (4)$$

where we introduce the normalization constant B. The new constant describes interaction of the photons with surrounding matter. With formula (4) we can calculate the normalized to the experimental data the photon energy distribution. In formula (4) E=total energy=$(h\nu)^2$, k = Boltzmann constant=1.3x10^{-23} JK^{-1}. K is for Kelvin degree. However in many applications in nuclear and elementary particles physics kT is recalculated in units of energy. To that aim we note that for 1K, kT is equal kx1K = K x 1.3x10^{-23} J x K^{-1}= 1.3 10^{-23} Joule or kT for 1K is equivalent to 1.3x10^{-23} Joule= 1.3x10^{-23} /(1.6x10^{-19}) eV = 0.8x10^{-4} eV. Eventually we obtain 1K= 0.8x10^{-4} eV, and 1eV= 1.2x10^4 K

$$\frac{dN}{dE} = BE_{\max}^2 e^{\left(\frac{E_{\max}}{T}\right)} \qquad (5)$$

The function *dN/dE* describes the energy spectrum of the emitted brain photons. In Figure 1 the calculated energy spectrum, formula (2) is presented. We present the result of the comparison of the calculated and observed spectra of the brain waves. The calculated spectra are normalized to the maximum of the measured spectra. The calculated spectrum is for temperature of brain source T= $0.8x10^{-14}$ eV. The obtained temperature is the temperature for the brain source in the thermal equilibrium.

The source is thermally isolated (adiabatic well). However in very exceptional cases the spectrum is changed – by the tunneling to the quantum potential well. The temperature 1 eV ≅ 10^4 K then brain wave thermal spectra T=$0.8x10^{-14}$ eV= $0.8x10^{-10}$ K. In Figure 2 we present the calculation of the energy spectrum for the Cosmic Background Radiation (CBR) (Durrer, 2008). The formula (5) was used for the model calculation. The normalized theoretical spectrum describes very well the observed CBR. The calculated temperature T=2.53 K, which is in excellent agreement with experimentally verified values. It must be stressed that in a paper we abandon the idea that every physical object is either a wave or a particle. Neither it is possible to say that particles "become" waves in the quantum domain and conversely that waves are "transformed "into particles.

It is therefore necessary to acknowledge that we have here a different kind of an entity, one that is specifically quantum. For this reason Levy-Leblond and Balibar developed the name quanton, (Levy-Leblond, Balibar, 1990). Following that idea the human brain emits *quantons* with energies $E = \hbar\omega$ formula (5). The brain *quantons* are the quantum objects that follows quantum laws: tunneling, the superposition and Heisenberg uncertainty rule. For the wave length of the quantons is of the order of Earth radius the quantum nature of the brain will be manifested in the Earth scale.

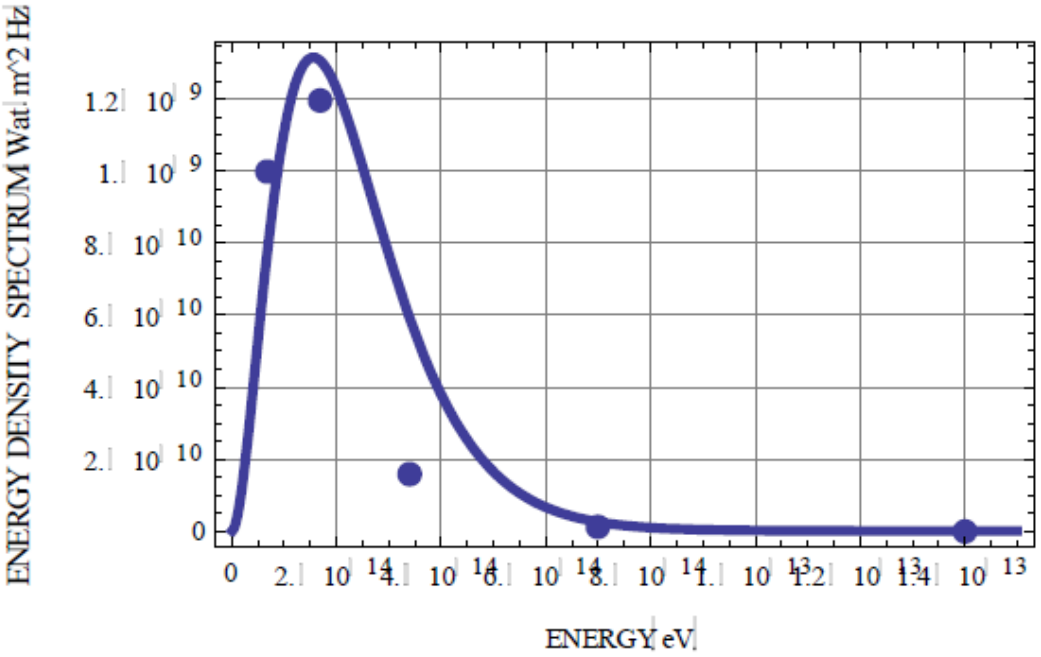

Figure 1. Model calculations for energy spectra of brain photons. The temperature of the source, T= 7.8 10^{-11} K.

5. Human Brain

According to general idea of Gestalt, we look for Design in Human brain. It is well known that the mass of human brain equals 1,5 kg, On another side human brain consists of 10^{11} neurons with mass of each equals 10^{-8}kg. (Kandel E R, 2012). We have the serious problem: mass of all neurons is equal 10^3 kg – is impossible great and is greater that the full body of an adult human. When I consult this fact with many neurologists they do not refuse my calculation and do not find out the solution. Our hypothesis is. The formula for the mass of human brain is not complete. My new formula for the human grain is

$$M_{HB} = N_N \bullet 10^{-5} g - B_E \qquad (24)$$

Table 2

	Mass	Mass in energy units,c=1
Proton	10^{-27} kg	~ 1 GeV
Human brain	1.5 kg	~ 1,5 10^{27}GeV
Neuron	10^{-5}g	~ 10^{19}GeV

$$B_G = -M_{HB} + N_N \bullet 10^{-5} g$$
$$B_G = -1.5kg + 10^3 kg = 998,5kg = 9.98 \bullet 10^{29} M_p \qquad (25)$$
$$B_G = 9.98 \bullet 10^{29} 1GeV$$

From formula (25), we conclude that the binding energy contributes about 99% of the mass of human brain. Binding energy is the *biological dark energy*. The same situation is for proton structure. The mass of a proton is about 980 MeV. By comparison the " bare " mass of an up quark is around 2 MeV and the bare mass of down quark is 5 MeV. A proton has two up quarks and one down quark, which combined contribute to only about 10 MeV. The rest of the mass about 970 MeV, comes from binding energy.

We can calculate binding energy per neuron:

$$\frac{9.98 \bullet 10^{29} GeV}{10^{11}} 9.98 \bullet 10^{18} GeV \qquad (26)$$

It occurs that binding energy per neuron in human brain is equal to mass of Planck particle, (M_p=10^{19}GeV) the building block of the Universe

6. Conclusions

The design of human brain – mass of neuron and number of neurons enable the calculation for the first time the new characteristics of brain, its binding energy = 10^{30} GeV. In the case of brain, the binding energy is the first and fundamental quantum property of the brain. To the point: We have possibility to separate brain (the neurons, axons…) and mind (binding energy of the brain). We argue that binding energy is the nest of consciousness. If we consider that number of humans is growing up- the global binding energy as the sum of all human brain binding energy is also growing up. The source of binding energy-human consciousness (soul) is the burst of energy of previous Aeon.

References

Penrose, R. (2008) Causality, quantum theory and cosmology. In *On Space and Time*, Shahn Majid *ed.*, (Cambridge University Press, Cambridge) pp. 141-195. (ISBN 978-0-521- 88926-1)

Penrose, R. (2009) The Basic Ideas of Conformal Cyclic Cosmology, in *Death And Anti- Death, Volume 6: Thirty Years After Kurt Gödel (1906-1978)*, Chapter 7, pp. 223-
242. (Ed. Charles Tandy, Ria University Press, Stanford, Palo Alto, Calif.) ISBN 978-1-934297-03-2

Penrose, R. (2010) *Cycles of Time: An Extraordinary New View of the Universe*. (Bodley Head, London) (ISBN 9780224080361)

Einstein, E., (1917) *Sitz.Preuss.Akad.derWiss.*1,142-152.

Penrose, R. (1963) *Phys. Rev. Lett*. 10, 66-8; Penrose, R. (1964) Conformal approach to infinity, in *Relativity, Groups and Topology*: The 1963 Les Houches Lectures, eds. B.S. DeWitt and C.M. DeWitt (Gordon and Breach, New York).

Penrose, R. (2004) *The Road to Reality: A Complete Guide to the Laws of the Universe*
(Jonathan Cape, London).

Schild R. Cosmology of Consciousness, Quantum Physics & Neuroscience of Mind, Cosmology Science Publishers, Cambridge, 2012.

Baierlein R. Thermal Physics, Cambridge University Press, 1999.

Marciak-Kozlowska J, Kozlowski M. Heisenberg's Uncertainty Principle and Human Brain. NeuroQuantology 2013; 11(1): 47-51.

Kozlowski M, Marciak-Kozlowska J. Brain Photons as the Quanta of the Quantum String. NeuroQuantology 2012; 10(3): 453-461.

Durrer R. The Cosmic Background. Cambridge University Press, 2008. Levy-Leblond J, Balibar F. Quantics. Els

Kandel E R et al. ,Principles of Neural Science , Fifth Edition, McGraw-Hill, USA, 2012 Marciak-Kozłowska, J, Kozłowski M, Extrasensory perception phenomena, Lambert Academic Publishing, (and references therein), 2016