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Recently it was experimentally shown that the DNA genetic information can be transmitted into water when the DNA and the water are subjected jointly to an electromagnetic field with 7Hz frequency. As announced, the reported phenomenon could allow developing highly sensitive detection systems for chronic bacterial and viral infections. Here, it is shown a possible explanation for the phenomenon based on the recent framework of Quantum Gravity. It is shown that, if volume of water with a DNA molecule is placed *near* another volume of pure water, and the *gravitational masses* of the two water volumes are simultaneously reduced to values in the range $+0.159m_{i0}$ to $-0.159m_{i0}$, by means of electromagnetic fields of extremely-low frequency (ELF), then the DNA genetic information are transmitted to pure water, imprinting onto it the structure of the DNA molecule. After several hours, as final result, a replication of the DNA can arise in the pure water.

Key words: DNA, Modified theories of gravity, Experimental studies of gravity, Memory of Water.
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1. Introduction

A recent experiment showed that the DNA genetic information can be transmitted into *water* when the DNA and the water are subjected jointly to an electromagnetic field with 7Hz frequency. The main researcher behind the new DNA experiment is a recent Nobel prizewinner, Luc Montagnier. He and his research partners have made a summary of his findings [1]. Montagnier's experiment basically consists in two test tubes, one of which contained a tiny piece of bacterial DNA, the other pure water. The tubes were then placed close to one another inside a horizontally oriented solenoid. Both tubes were jointly subjected to a weak electromagnetic field with 7Hz frequency. Eighteen hours later, after DNA amplification using a polymerase chain reaction, as if by magic, *the DNA was detectable in the test tube containing pure water*, showing that, under certain conditions, DNA can project copies of itself in another place.

As mentioned in a recently published article in the *New Scientist* [2], 'physicists in Montagnier's team suggest that DNA emits low-frequency electromagnetic waves which imprint the structure of the molecule onto the water. This structure, they claim, is *preserved* and amplified through quantum coherence effects, and because it mimics the shape of the original DNA, the enzymes in the PCR process mistake it for DNA itself, and somehow use it as a template to make DNA match that which "sent" the signal'.

Here, based on the framework of a recently proposed theory of Quantum Gravity [3], is presented a consistent explanation showing how an exact copy of the structure of the DNA molecule is imprinted onto the *pure water*.

2. Theory

The quantization of gravity showed that the *gravitational mass* m_g and *inertial mass* m_i are correlated by means of the following factor [3]:

$$\frac{m_g}{m_{i0}}=\left\{1-2\left[\sqrt{1+\left(\frac{\Delta p}{m_{i0}c}\right)^2}-1\right]\right\} \tag{1}$$

where m_{i0} is the *rest* inertial mass of the particle and Δp is the variation in the particle's *kinetic momentum*; c is the speed of light.

When Δp is produced by the absorption of a photon with wavelength λ, it is expressed by $\Delta p = h/\lambda$. In this case, Eq. (1) becomes

$$\frac{m_g}{m_{i0}}=\left\{1-2\left[\sqrt{1+\left(\frac{h/m_{i0}c}{\lambda}\right)^2}-1\right]\right\}$$
$$=\left\{1-2\left[\sqrt{1+\left(\frac{\lambda_0}{\lambda}\right)^2}-1\right]\right\} \tag{2}$$

where $\lambda_0 = h/m_{i0}c$ is the *De Broglie wavelength* for the particle with *rest* inertial mass m_{i0}.

It is easily seen that m_g cannot be strongly reduced simply by using electromagnetic waves with wavelength λ because λ_0 is much smaller than $10^{-10}\,m$. However, it is known that the wavelength of a radiation can be strongly reduced simply by strongly reducing its velocity.

From Electrodynamics we know that when an electromagnetic wave with frequency f and velocity c incides on a material with relative permittivity ε_r, relative magnetic permeability μ_r and electrical conductivity σ, its *velocity is reduced* to $v = c/n_r$ where n_r is the index of refraction of the material, given by [3]

$$n_r = \frac{c}{v} = \sqrt{\frac{\varepsilon_r \mu_r}{2}\left(\sqrt{1+(\sigma/\omega\varepsilon)^2}+1\right)} \qquad (3)$$

If $\sigma >> \omega\varepsilon$, $\omega = 2\pi f$, the Eq. (3) reduces to

$$n_r = \sqrt{\frac{\mu_r \sigma}{4\pi\varepsilon_0 f}} \qquad (4)$$

Thus, the wavelength of the incident radiation becomes

$$\lambda_{\text{mod}} = \frac{v}{f} = \frac{c/f}{n_r} = \frac{\lambda}{n_r} = \sqrt{\frac{4\pi}{\mu f \sigma}} \qquad (5)$$

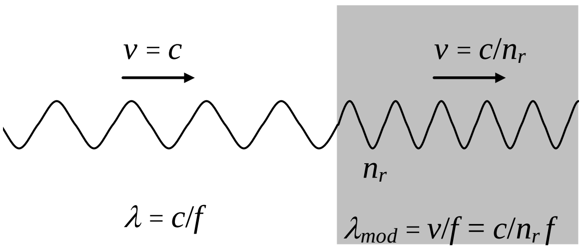

Fig. 1 – *Modified Electromagnetic Wave*. The wavelength of the electromagnetic wave can be strongly reduced, but its frequency remains the same.

Now consider a $7Hz$ ($\lambda \cong 4.3\times 10^7\,m$) radiation incident on pure water ($\sigma = 2\times 10^{-4}\,S/m$). According to Eq. (5), the *modified wavelength* is

$$\lambda_{\text{mod}} = \sqrt{\frac{4\pi}{\mu f \sigma}} = 8.4\times 10^4\,m \qquad (6)$$

Consequently, the wavelength of the $7Hz$ radiation *inside the water* will be $\lambda_{\text{mod}} = 8.4\times 10^4\,m$ and not $\lambda \cong 4.3\times 10^7\,m$.

If a water lamina with thickness equal to ξ contains n molecules/m^3, then the number of molecules per unit area is $n\xi$. Thus, if the electromagnetic radiation with frequency f incides on an area S of the lamina it reaches $nS\xi$ molecules. If it incides on the total area of the lamina, S_f, then the total number of molecules reached by the radiation is $N = nS_f\xi$. The number of molecules per unit volume, n, is given by

$$n = \frac{N_0 \rho}{A} \qquad (7)$$

where $N_0 = 6.02\times 10^{26}\,molecules/kmole$ is the Avogadro's number; ρ is the matter density of the lamina(*kg/m*^{3})and A is the Molar Mass. In the case of pure *Water* $\left(\rho = 10^3\,kg/m^3, A = 18.01\,kg.kmole^{-1}\right)$ the result is

$$n_{water} = 3.34\times 10^{28}\,molecules/m^3 \qquad (8)$$

The *total number of photons* inciding on the water is $n_{total\ photons} = P/hf^2$, where P is the power of the radiation flux incident on the water.

When an electromagnetic wave incides on the water, it strikes on N_f front molecules, where $N_f \cong (nS_f)\phi_m$. Thus, the wave incides effectively on an area $S = N_f S_m$, where $S_m = \frac{1}{4}\pi\phi_m^2 \cong 7\times 10^{-21}\,m^2$ is the cross section area of one molecule of the water molecule. After these collisions, it carries out $n_{collisions}$ with the other atoms of the foil (See Fig.2).

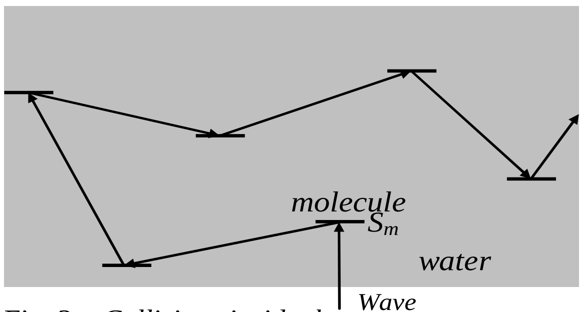

Fig. 2 – *Collisions inside the water.*

Thus, the total number of collisions in the volume $S\xi$ is

$$N_{collisions} = N_f + n_{collisions} = nS_f\delta + \left(nS\xi - nS_f\delta\right) = \\ = nS\xi \qquad (9)$$

The power density, D, of the radiation on the water can be expressed by

$$D = \frac{P}{S} = \frac{P}{N_f S_m} \qquad (10)$$

We can express the *total mean number of collisions in each molecule*, n_1, by means of the following equation

$$n_1 = \frac{n_{total\ \ photons} N_{collisions}}{N} \qquad (11)$$

Since in each collision a *momentum* h/λ is transferred to the molecule, then the *total momentum* transferred to the water will be $\Delta p = \left(n_1 N\right)h/\lambda$. Therefore, in accordance with Eq. (1), we can write that

$$\frac{m_g}{m_{i0}} = \left\{1 - 2\left[\sqrt{1 + \left[\left(n_1 N\right)\frac{\lambda_0}{\lambda}\right]^2} - 1\right]\right\} = \\ = \left\{1 - 2\left[\sqrt{1 + \left[n_{total\ photons} N_{collisions}\frac{\lambda_0}{\lambda}\right]^2} - 1\right]\right\} \qquad (12)$$

Since Eq. (9) gives $N_{collisions} = nS\xi$, we get

$$n_{total\ \ photons} N_{collisions} = \left(\frac{P}{hf^2}\right)\left(nS\xi\right) \qquad (13)$$

Substitution of Eq. (13) into Eq. (12) yields

$$\frac{m_g}{m_{i0}} = \left\{1 - 2\left[\sqrt{1 + \left[\left(\frac{P}{hf^2}\right)\left(nS\xi\right)\frac{\lambda_0}{\lambda}\right]^2} - 1\right]\right\} \qquad (14)$$

Substitution of P given by Eq. (10) into Eq. (14) gives

$$\frac{m_g}{m_{i0}} = \left\{1 - 2\left[\sqrt{1 + \left[\left(\frac{N_f S_m D}{f^2}\right)\left(\frac{nS\xi}{m_{i0}c}\right)\frac{1}{\lambda}\right]^2} - 1\right]\right\} \qquad (15)$$

Substitution of $N_f \cong \left(nS_f\right)\phi_m$ and $S = N_f S_m$ into Eq. (15) the result is

$$\frac{m_g}{m_{i0}} = \left\{1 - 2\left[\sqrt{1 + \left[\left(\frac{n^3 S_f^2 S_m^2 \phi_m^2 D\xi}{m_{i0}cf^2}\right)\frac{1}{\lambda}\right]^2} - 1\right]\right\} \\ = \left\{1 - 2\left[\sqrt{1 + \left[\left(\frac{n^3 S_m^2 \phi_m^2 S_f D}{\rho c f^2}\right)\frac{1}{\lambda}\right]^2} - 1\right]\right\} \qquad (16)$$

In the case of the *water*, we can take the following values: $n = 3.34\times10^{28}\, molecules/m^3$; $S_f \cong 1.9\times10^{-5}m^2$ (S_f is the area of the horizontal cross-section of the test tube); $S_m \cong 7\times10^{-21}m^2$; $\phi_m \cong 1\times10^{-10}m$; ξ (height of water inside the test tube). Substitution of these values into Eq. (16), gives

$$\frac{m_{g(water)}}{m_{i0(water)}} = \left\{1 - 2\left[\sqrt{1 + \left[\left(1.1\times10^9\,\frac{D}{f^2}\right)\frac{1}{\lambda}\right]^2} - 1\right]\right\} \qquad (17)$$

In the case of a $7Hz$ radiation, Eq. (6) shows that $\lambda_{\mathrm{mod}} = 8.4\times10^4 m$. Thus, by substitution of λ by λ_{mod} into Eqs. (17) , we get the following expression

$$\frac{m_{g(water)}}{m_{i0(water)}} \cong \left\{1 - 2\left[\sqrt{1 + 7.1\times10^4 D^2} - 1\right]\right\} \qquad (18)$$

Now, considering that the water is inside a solenoid, which produces a weak ELF electromagnetic field with E_m and B_m, then we can write that [4]

$$D = \frac{E_m^2}{2\mu_0 v_{water}} = \frac{v_{water}^2 B_m^2}{2\mu_0 v_{water}} = \frac{cB_m^2}{2\mu_0 n_{(water)}} \qquad (19)$$

Equation (4) shows that for $f = 7Hz$, $n_{r(water)} = 506.7$ .Substitution of this value into Eq.(19) gives

$$D = 2.3\times10^{11} B_m^2$$

Substitution of this value into Eq. (19) gives

$$\frac{m_{g(water)}}{m_{i0(water)}} \cong \left\{1 - 2\left[\sqrt{1 + 3.7\times10^{27} B_m^4} - 1\right]\right\} \qquad (20)$$

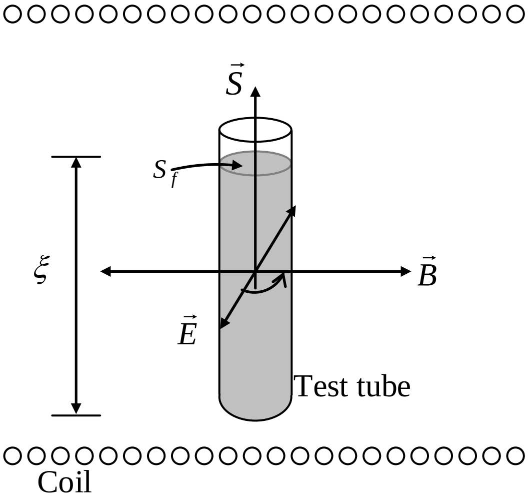

Fig. 3 – The vector of *Pointing* $\vec{S}=\vec{E}\times\vec{B}$ at the test tube. The electromagnetic radiation propagates in the direction of the vector of *Pointing*

In Montagnier's experiment, the set-up was placed in a container shielded by 1 mm thick layer of *mumetal* in order to avoid interference from the earth's natural magnetic field, whose intensity is $B_{\oplus}\cong 6\times10^{-5}T$. This is because the intensity of magnetic field in Montagnier's experiment was much smaller than $B_{\oplus}$. Note that, if the intensity of the magnetic field is in the range $1.2\times10^{-7}T<B_m<1.4\times10^{-7}T$, then, according to Eq. (20), the gravitational masses of the *water with DNA* and the *water inside the other test tube* are reduced to values in the range $+0.159m_{i0}$ to $-0.159m_{i0}$. It was shown in a previous paper [3] that, when this occurs the gravitational masses becomes *imaginaries* and the bodies leave our *Real* Universe, i.e., they perform transitions to the *Imaginary* Universe, which contains our *Real* Universe. The terms real and imaginary are borrowed from mathematics (real and imaginary numbers). It was also shown that in the Imaginary Universe the imaginary bodies are subjected to the *Imaginary Interaction* that is similar to the Gravitational Interaction. If the masses of the bodies have the same sign, then the interaction among them will be attractive.

The masses of the water with DNA and the pure water are decreased at the same ratio,

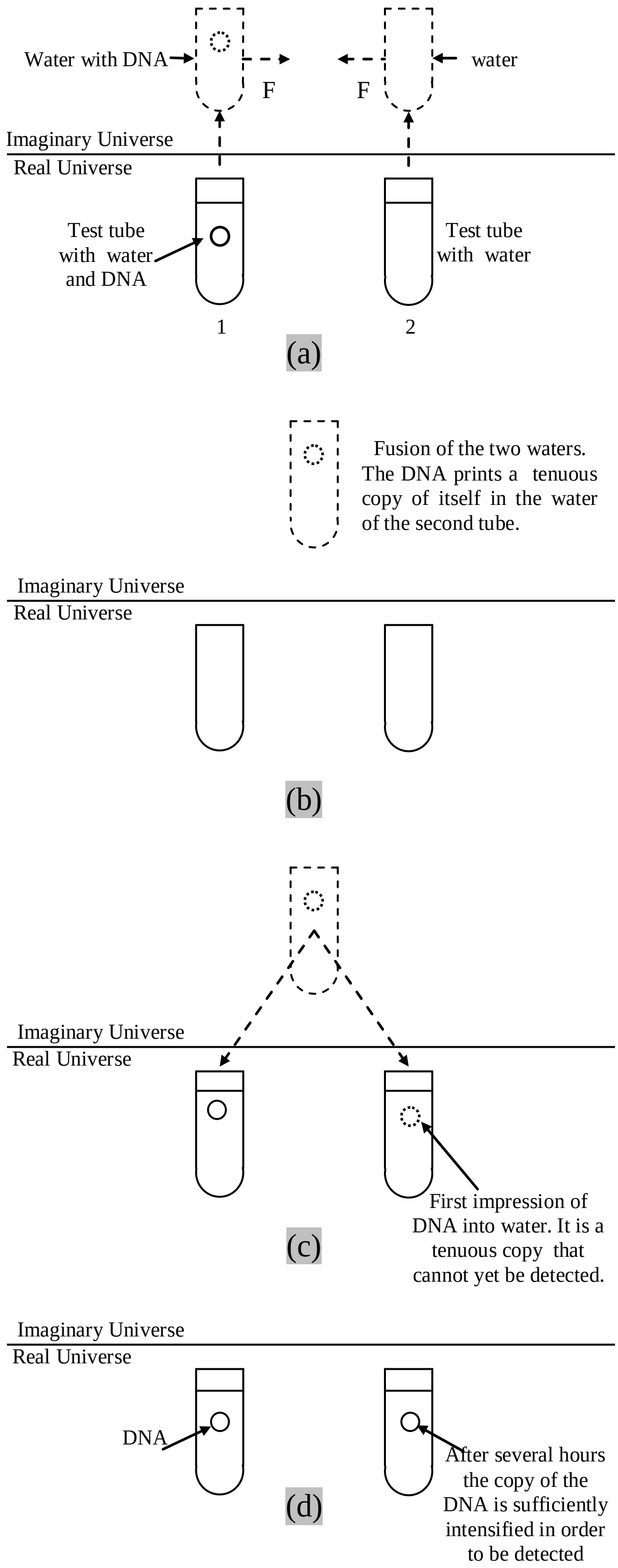

Fig. 4 – (a) Transition to the Imaginary Universe and attraction. (b) Fusion of the two waters. (c) Return to Real Universe. (d) After several comings and goings to the Imaginary Universe a real copy of the DNA can be detected in the tube with pure water.

in such way that they remain with the same sign. Thus, when they arrive the Imaginary Universe the *attractive* imaginary interaction approaches each other. *Due to the small distance between them*[*], they are subjected to a significative attraction. Consequently, they entered one another (fusion). This imprints in the *pure water* an exactly copy of the DNA molecule. However, the water with DNA and the pure water return immediately to the real universe because the ELF electromagnetic field does not accompany them during the transition. When they get back to the real universe, the effect previously produced by the ELF electromagnetic field sends again the water with DNA and pure water to Imaginary Universe, and again a new imprint of the DNA is produced at the same place of the first one, strengthening the copy of DNA onto the water.

Thus, during the time interval in what the ELF electromagnetic field remains on, the process continue. After some hours (16 to 18 hours in the case of Montagnier's experiment) the copy of the DNA can become sufficiently strong to be detected. Thus, when the ELF electromagnetic field is turned off, the water can contain a real DNA molecule, which is an exactly equal to that one that exists in the other tube.

The physicists in Montagnier's team suggest that the imprints of the DNA are preserved through *quantum coherence effects* [1]. This conclusion is based on the framework of a recently proposed theory of liquid water based on Quantum Field Theory (QFT) [5-10]. Jacques Benveniste [11] has been the first to propose (1988) that water has memory. The fact that the water contains electric dipoles, which can give to it a significant memory capacity, has been also considered by Brian Josephson [12] and, more recently by J. Dunning-Davies [13].

[*] Due to the small distance between the two test tubes. The tubes were then placed near to one another inside a horizontally oriented solenoid.

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