Emergence of life in pure water

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Recently, some authors have shown that life can be emerged in pure water. We confirm this claim and propose a mechanism for extracting DNA from pure water. In this model, water has two structures which are the same in four dimensions and different in extra dimensions. These structures are similar to the structures of DNAs of men and women in extra dimensions. This helps the water to store two different informations of DNAs. Some special waves can interact with water and extract it’s structure from extra dimension. These waves act like topoisomerases in biology on 11-dimensional manifold.

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I. INTRODUCTION

One of interesting subjects in science that may be originated from exchanging information with extra dimensions is the water memory. Water memory is the purported ability of water to retain a memory of substances previously dissolved in it even after an arbitrary number of serial dilutions [1]. Many discussions have been done on this subject and it’s applications [2–5]. In one of these applications, Montagnier and his collaborators have considered about transduction of DNA information through water. They have studied the capacity of water for transferring the radiated signals from bacterial and viral DNAs [6]. Also, other authors have described the experimental conditions by which electromagnetic signals (EMS) of low frequency can be emitted by diluted aqueous solutions of some bacterial and viral DNAs in water[7]. And in more recent investigation, it has been discussed that there should be two different waters for storing information of DNAs. This is because that types of packing of

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DNA in chromosomes of males and females are different. This causes that radiated waves from DNAs of males and females have opposite signs and cancel the effect of each other[8]. Thus, to store information of two DNAs, we need to two structures for waters. However, the structures of water in four dimensions are the same. Thus, the question arises that how water stores these two types of information?

Recently, some investigators have argued about the physical origin of life and considered the process of the emergence of organism from some special states of water [9]. We will generalize this discussion and show that DNA has two structures on 11-dimensional manifold. One of these structures interacts with DNA of women and another stores information of DNA in men. These structures are the same in four dimensions and different in extra dimensions. The part of water in extra dimension includes some molecules of DNA. In special conditions, some waves can replace the part of structure in four dimension by part of it in extra dimension and life is emerged. These waves act like topoisomerases in biology [10–12] on 11-dimensional manifold.

The outline of the paper is as follows. In section II, we will consider the structure of topoisomerse-like waves and water in extra dimensions. In section III, we will discuss about the process of extracting DNA from water and the emergence of life. The last section is devoted to conclusions.

II. THE STRUCTURE OF WATERS AND TOPOISOMERASE-LIKE WAVES IN EXTRA DIMENSIONS

In this section, first, we consider the structure of DNA in 11-dimensions. To this aim, we will use of the concept of string theory. This is because that in our model, DNA is a 4 +n-dimensional object which live on manifolds in 11 dimensions and can packed into 4 dimension. In 11-dimensional theories like M-theory, electrons are strings in 11 dimensions and their effects in 4-dimensions can be seen as fermionic fields. These electrons in each atom of a DNA are paired and form the scalar fields like the scalar strings in string theory $(\bar{\psi}_\uparrow \psi_\downarrow \rightarrow X)$. Also, some electrons of each atom are paired with electrons of another atom. When, a DNA is packed, some extra fields are emerged that play the role of extra photons in 4-dimensions (see figure 1). These fields change the action and Hamiltonian of DNAs and produce some new wormhole-like tunnels. We introduce the action of two interacting atom
in 11-dimensions [13, 14]:

\[ S_{\text{atom-atom}} = -T_{\text{tri}} \int d^{11}\sigma \sqrt{\eta^{ab} g_{MN} \partial_a X^M \partial_b X^N + 2\pi l_s^2 U(F) + 2\pi l_s^2 \bar{U}(\bar{F})} \]

\[ U = \left( \sum_{n=1}^{z} \frac{1}{n!} \left( -\frac{F_1 \cdots F_n}{\beta^2} \right) \right) \]

\[ \bar{U} = \left( \sum_{n=1}^{\bar{z}} \frac{1}{n!} \left( -\frac{\bar{F}_1 \cdots \bar{F}_n}{\beta^2} \right) \right) \]

\[ F = F_{\mu\nu} \]

\[ F_{\mu\nu} = \partial_{[\mu} A_{\nu]} - \partial_{\nu} A_{\mu} \] (1)

\[ H_{\text{atom-atom}} = 4\pi T_{\text{tri}} \int d\sigma_1 \cdots d\sigma_1 [(1 + Q_{z,\text{atom-atom}})(1 + \bar{Q}_{\bar{z},\text{atom-atom}})] \times \]

\[ \sqrt{1 + \eta^{ab} g_{MN} g_{MN} \psi_{\text{atom1}}^{M\uparrow} \partial_a \psi_{\text{atom2}}^{M\downarrow} \psi_{\text{atom2}}^{N\uparrow} \partial_b \psi_{\text{atom1}}^{N\downarrow}} \times \]

\[ \sqrt{1 + \eta^{ab} g_{MN} g_{MN} \psi_{\text{atom1}}^{M\uparrow} \partial_a \psi_{\text{atom2}}^{M\downarrow} \psi_{\text{atom2}}^{N\uparrow} \partial_b \psi_{\text{atom1}}^{N\downarrow}} \]

where \( z \) is the number of paired electrons, \( \bar{z} \) is the number of photons which are produced by the packings of DNA, \( g_{MN} \) is the background metric, \( X^M(\sigma^a) \)'s are scalar fields which are constructed from paring two electrons with opposite spins, \( \sigma^a \)'s are the manifold coordinates, \( a, b = 0, 1, ..., 3 \) are world-volume indices of the manifold and \( M, N = 0, 1, ..., 11 \) are eleven dimensional spacetime indices. Also, \( U \) is the nonlinear field \([13]\) and \( A \) is the photon which exchanges between atoms. Also, \( \bar{A} \) is the photon which is emerged by the packings of DNA. Using the method in ref [13, 14] and substituting \( X \rightarrow \psi^\dagger \psi \), we can obtain the Hamiltonian for interacting atoms:
\[ \bar{Q}_{z,\text{atom-atom}} = \bar{Q}_{z-1,\text{atom-atom}} \sqrt{1 + \frac{k_2^2}{Q_{z-1,\text{atom-atom}}}} \cdots \sqrt{1 + \frac{k_2^2}{Q_{1,\text{atom-atom}}}} \]

\[ \sqrt{1 + \frac{k_1^2}{\theta_1,\text{atom-atom}}} \]

\[ Q_{z,\text{atom-atom}} = Q_{z-1,\text{atom-atom}} \sqrt{1 + \frac{k_2^2}{Q_{z-1,\text{atom-atom}}}} \cdots \sqrt{1 + \frac{k_2^2}{Q_{1,\text{atom-atom}}}} \]

\[ Q_{1,\text{atom-atom}} = \sqrt{1 + \frac{k_1^2}{\sigma_1,\text{atom-atom}}} \]

(2)

where \( \sigma \) is the separation distance between two atoms and \( \theta \) is the angle of packings. Also, packing of DNA changes the couplings between fermions and produce some new couplings which are presented by \( \bar{\psi} \).

In a DNA, atoms are placed in a hexagonal and pentagonal molecules (See figure 2). In a hexagonal molecule, each atom can interact with two atoms directly and three other atoms indirectly. We can write the Hamiltonian of this system as:

\[ H_6 = 4\pi T_{tri} \int d\sigma_{11} \cdots d\sigma_1 Q_{6,\text{packed}} E_{6,\text{packed}} Q_{6,\text{un-packed}} E_{6,\text{un-packed}} \]

\[ Q_{6,\text{un-packed}} = \prod_{n=1}^{5} \left[ \sum_{i,j=1}^{n} (1 + Q_{z,\text{un-packed},i-j}) \right] \]

\[ E_{6,\text{un-packed}} = \prod_{n=1}^{5} \left[ \sum_{i,j=1}^{n} (1 + E_{z,\text{un-packed},i-j}) \right] \]

\[ E_{z,\text{un-packed},i-j} = \sqrt{1 + \psi^{ab} g_{MN} g_{MN} \psi^{M,i}_i \partial_\theta \psi^{M,i}_j \psi^{N,i}_i \partial_\theta \psi^{N,i}_j} \]

\[ Q_{z,\text{un-packed},i-j} = Q_{z-1,\text{un-packed},\text{atom-atom}} \sqrt{1 + \frac{k_2^2}{Q_{z-1,\text{un-packed},i-j}}} \cdots \sqrt{1 + \frac{k_2^2}{Q_{1,\text{un-packed},\text{atom-atom}}}} \]

FIG. 2: Hexagonal and pentagonal shapes of bases in a DNA
\[ Q_{\text{un-packed},i-j} = \sqrt{1 + \frac{k^2_{i}}{\sigma^2_{i,j}}} \]

\[ Q_{\text{6-packed}} = \Pi_{n=1}^{5} [\Sigma_{i,j=1}^{n} (1 + Q_{z,\text{packed},i-j})] \]

\[ E_{\text{6-packed}} = \Pi_{n=1}^{5} [\Sigma_{i,j=1}^{n} (1 + E_{z,\text{packed},i-j})] \]

\[ E_{z,\text{packed},i-j} = 1 + \eta^{ab} g_{MN} g_{MN} \partial_{a} \psi_{j}^{M,\uparrow} \partial_{b} \psi_{j}^{N,\uparrow} \]

\[ Q_{z,\text{packed},i-j} = Q_{z-1,\text{packed},\text{atom}-\text{atom}} \sqrt{1 + \frac{k^2_{i}}{Q_{z-1,\text{packed},\text{atom}-\text{atom}}}} \theta_{z,i-j}^{4} \]

\[ Q_{\text{1-packed},i-j} = \sqrt{1 + \frac{k^2_{i}}{\theta_{i,j}^{4}}} \]

\[ \text{where } i, j \text{ are labels of atoms in hexagonal molecule. The same results can be obtained for pentagonal manifolds so.} \]

Summing over all manifolds of DNA, we can obtain total Hamiltonian of DNA as:

\[ H_{\text{DNA}} = 4\pi T_{\text{tri}} \int d\sigma_{11}...d\sigma_{1} Q_{\text{DNA}} E_{\text{DNA}} \]

\[ Q_{\text{DNA}} = \Sigma_{M,N,X,Y=1}^{W} Q_{\text{un-packed},DNA,N,M} Q_{\text{packed},DNA,N,Y} \]

\[ E_{\text{DNA}} = \Sigma_{M,N,X,Y=1}^{W} E_{\text{un-packed},DNA,N,M} E_{\text{packed},DNA,N,X} \]

\[ Q_{\text{un-packed},DNA,M,N} = \Pi_{n=1}^{N} [\Sigma_{i,j=1}^{n} (1 + Q_{6,i-j})] \Pi_{m=1}^{M} [\Sigma_{l,k=1}^{m} (1 + Q_{5,i-j})] \]

\[ E_{\text{un-packed},DNA,M,N} = \Pi_{n=1}^{N} [\Sigma_{i,j=1}^{n} (1 + E_{6,i-j})] \Pi_{m=1}^{M} [\Sigma_{l,k=1}^{m} (1 + E_{5,i-j})] \]

\[ Q_{\text{packed},DNA,X,Y} = \Pi_{n=1}^{N} [\Sigma_{i,j=1}^{n} (1 + \bar{Q}_{6,i-j})] \Pi_{m=1}^{M} [\Sigma_{l,k=1}^{m} (1 + \bar{Q}_{5,i-j})] \]

\[ E_{\text{packed},DNA,X,Y} = \Pi_{n=1}^{N} [\Sigma_{i,j=1}^{n} (1 + \bar{E}_{6,i-j})] \Pi_{m=1}^{M} [\Sigma_{l,k=1}^{m} (1 + \bar{E}_{5,i-j})] \]

\[ Q_{\bar{6},i-j} \text{ and } E_{\bar{6},i-j} \text{ are parameters of Hamiltonians of i-th and j-th hexagonal molecules in 11-dimensions, } Q_{5,i-j} \text{ and } E_{5,i-j} \text{ are parameters of Hamiltonians of i-th and j-th pentagonal molecules and } Q_{5-6,i-j} \text{ and } E_{5-6,i-j} \text{ are parameters of} \]
Hamiltonians of i-th hexagonal and j-th pentagonal molecules. This Hamiltonian contain all interactions between various types of molecules in a DNA. It is clear that shape of molecules have a direct effect on the storing information in this system. When, a wave achieve to a DNA, read information which is stored as the exchanged energy between hexagonal and pentagonal molecules. This amount of information is more than what is used in biology. This system is very complicated and waves couldn’t read it’s information easily (See figure 3). They should open packings of DNA in extra dimensions and make it’s topology simple. For this reason, it is needed that the waves give an appropriated energy to DNA, excite it and open it’s packings. In these conditions, total energy and topology system tend to a constant number. We can write:

\[
1 = H_{DNA} + H_{topoisomerase-like-wave} = 4\pi T_{tri} \int d\sigma_{11}…d\sigma_1 [Q_{DNA}E_{DNA} + Q_{topoisomerase}E_{topoisomerase}] = 4\pi w \int d\sigma_{11}…d\sigma_1 \Pi_{n=1}^{w} [\delta(\sigma_n + \theta_n)]
\]

where we have replaced \(4\pi T_{tri}\) by \(\frac{4\pi w}{V_{11-w}}\). Here, \(V_{11-w}\) is the volume of space which is empty of DNA. To obtain this delta function, we can use of waves that number of packed manifolds in them is equal to number of un-packed manifolds of DNA and also, number of un-packed manifolds in them is equal to number of packed manifolds in DNA. To this
aim, we put $X, Y$ instead of $M, N$ and also $M, N$ instead of $X, Y$ in Hamiltonian of DNA (equation (4)) and write:

$$H_{\text{topoisomerase-like-wave}} = 4\pi T_{\text{tri}} \int d\sigma_1...d\sigma_1 Q_{\text{topoisomerase}} E_{\text{topoisomerase}}$$

$$Q_{\text{topoisomerase}} = \sum_{M,N,X,Y=1}^{W} Q_{\text{un-packed, topoisomerase},X,Y} Q_{\text{packed, topoisomerase},M,N}$$

$$E_{\text{topoisomerase}} = \sum_{M,N,X,Y=1}^{W} E_{\text{un-packed, topoisomerase},X,Y} E_{\text{packed, DNA},M,N}$$  \hspace{1cm} (6)$$

Using equations (4 and 6), we can obtain the explicit form of delta function in equation (5) for small values of $K$ ($K \to 0$):

$$\delta(\sigma_n - \theta_n) = \frac{1}{\pi} \frac{[K_{\sigma_n} + K_{\theta_n}]^2}{[K_{\sigma_n} + K_{\theta_n}]^2 + [\theta_n + \sigma_n]^2}$$  \hspace{1cm} (7)$$

FIG. 4: Topoisomerase-like waves in extra dimensions open packings of DNAs

Above results show that to exchange information between DNAs, it is needed to some waves which their structures are similar to topoisomerases in biology (See figure 4). In these systems, number of packed manifolds is equal to number of un-packed manifolds of DNA and number of un-packed manifolds is equal to number of packed manifolds in DNA. By joining these waves to DNA, Hamiltonian and topology of system tends to a constant number. In these conditions, all information of DNA can be recovered and transmitted.

Now, we consider the structures of water from point of view of one observer which live in extra dimensions. Molecules of water are constructed from one oxygen and two atoms of Hydrogen. This system can form a trigonal manifold in 4-dimensions (See figure 5). To show the interaction of this system with other molecules and waves, we use of the concept in string theory. We assume that electrons of atoms are paired and form the scalar fields like the scalar strings in string theory ($\bar{\psi}_1 \psi_1 \rightarrow X$). Also, each atom in one molecule interacts with other two atoms via exchanging photon ($A$).
To begin, we introduce the action of triangular manifold of water [13, 14]:

\[
S_{\text{water, 4-dimensions}} = -T_{\text{tri}} \int d^4 \sigma \sqrt{\eta^{ab} g_{MN} \partial_a X^M \partial_b X^N + 2 \pi l_s^2 U(F)}
\]

\[
U = \left( \sum_{n=1}^{2} \frac{1}{n!} \left( \frac{F_{1,0-H} \ldots F_{n,0-H}}{\beta^2} \right) + F_{H-H} \right)
\]

\[
F = F_{\mu \nu} F^{\mu \nu} \quad F_{\mu \nu} = \partial_\mu A_\nu - \partial_\nu A_\mu
\]

where \( g_{MN} \) is the background metric, \( X^M(\sigma^a) \)'s are scalar fields which are constructed from paring two electrons with opposite spins, \( \sigma^a \)'s are the manifold coordinates, \( a, b = 0, 1, ..., 3 \) are world-volume indices of the manifold and \( M, N = 0, 1, ..., 11 \) are eleven dimensional spacetime indices. Also, \( G \) is the nonlinear field [11] and \( A \) is the photon which exchanges between atoms. Using the method in ref [13], we can obtain the Hamiltonian for triangular manifolds:
\[ H_{\text{water,4-dimensions}} = 4\pi T_{\text{tri}} \int d\sigma_3 d\sigma_2 d\sigma_1 \sqrt{1 + \eta^{ab} g_{MN} \partial_a X^M \partial_b X^N} Q_{\text{water,4-dimensions}} \]

\[ Q_{\text{water,4-dimensions}} = Q_{H-H} + Q_{2,O-H} \]

\[ Q_{H-H} = \sqrt{1 + \frac{k_1^2}{\sigma_{1,H-H}^4}} \]

\[ Q_{2,O-H} = Q_{1,O-H} \sqrt{1 + \frac{k_2^2}{Q_1 \sigma_{2,O-H}^4}} \]

\[ Q_{1,O-H} = \sqrt{1 + \frac{k_1^2}{\sigma_{1,O-H}^4}} \]  \hspace{1cm} (9)

By substituting \( X \rightarrow \psi_{\uparrow}^\dagger \psi_{\downarrow} \), we can rewrite the trigonal Hamiltonian as:

\[ H_{\text{water,4-dimensions}} = 4\pi T_{\text{tri}} Q_{\text{water,4-dimensions}} E_{\text{water,4-dimensions}} \]

\[ E_{\text{water,4-dimensions}} = \int d\sigma_3 d\sigma_2 d\sigma_1 \sqrt{1 + \eta^{ab} g_{MN} g_{MN} \psi_{\uparrow}^M \partial_a \psi_{\uparrow}^N \psi_{\downarrow}^M \partial_b \psi_{\downarrow}^N} \]

\[ Q_{\text{water,4-dimensions}} = Q_{H-H} + Q_{2,O-H} \]

\[ Q_{H-H} = \sqrt{1 + \frac{k_1^2}{\sigma_{1,H-H}^4}} \]

\[ Q_{2,O-H} = Q_{1,O-H} \sqrt{1 + \frac{k_2^2}{Q_1 \sigma_{2,O-H}^4}} \]

\[ Q_{1,O-H} = \sqrt{1 + \frac{k_1^2}{\sigma_{1,O-H}^4}} \]  \hspace{1cm} (10)

where \( \psi_{O/H}^{\uparrow/\downarrow} \) is the electronic fields of Oxygen or Hydrogen atoms. This can’t be total Hamiltonian of water. This is because that this Hamiltonian can’t explain the reason for the emergence of memory in water. To obtain the real Hamiltonian of water, we should go to extra dimensions (See figure 7). Using equations (4,5,10), we obtain

\[ 1 = H_{\text{DNA,Men}} + H_{\text{topoisomerase-like-wave,Men}} = H_{\text{water}} + H_{\text{topoisomerase-like-wave,Men}} \]

\[ \Rightarrow H_{\text{water,extra,Men}} = 4\pi T_{\text{tri}} \int d\sigma_{1} \ldots d\sigma_1 Q_{\text{water,4-dimensions}}^{-1} E_{\text{water,4-dimensions}}^{-1} \times \]

\[ \left[ \prod_{n=1}^{w} \delta(\sigma_n + \theta_n) - Q_{\text{DNA,Men}} E_{\text{DNA,Men}} \right] \]  \hspace{1cm} (11)
One of interesting point in this model is the existence differences between topoisomerase-like waves which open packings of DNAs of men with those that open packings of DNAs of women. This is because that type of packings of DNAs in men is different from packings of DNAs in women. Consequently, we should have two different topoisomerase-like waves. On the other hand, experiments show that these waves interact with water and store information in it. If memory of water be accepted, there should be two types of coding for water, one related to waves of men and another corresponded to waves of women. This means that water has two types of structures in 4 +n-dimensions (See figure 7). These structures are the same in four dimensions however their differences can be seen in extra dimensions. Infact, structures of waters in extra dimensions contribute in storing information and the emergence of water memory.

III. EXTRACTING DNA FROM PURE WATER

In this section, we will show that in some conditions, DNA can be extracted from pure water. To this aim, we need to some waves that replace the structure of water in four dimension by it’s structure in extra dimension. First, we multiply equations (11 and 12) by $[1 + H_{DNA}]$ and write:

\[
1 = H_{DNA,Women} + H_{topoisomerase-like-wave,Women} = \\
H_{water} + H_{topoisomerase-like-wave,Women} \\
\implies H_{water,extra,Women} = 4\pi T_{tri} \int d\sigma_{11} \ldots d\sigma_{1} Q_{water,4-dimensions}^{-1} E_{water,4-dimensions}^{-1} \times \\
[\prod_{n=1}^{w}[\delta(\sigma_{n} + \theta_{n}) - Q_{DNA,Women} E_{DNA,Women}] (12)
\]
\[ 1 = H_{\text{water, Men}} + H_{\text{topoisomerase-like-wave, Men}} \otimes [1 + H_{\text{DNA, Men}}] \]  
(13)

\[ 1 = H_{\text{water, Women}} + H_{\text{topoisomerase-like-wave, Women}} \otimes [1 + H_{\text{DNA, Women}}] \]  
(14)

FIG. 8: Extracting DNA from pure water

Now, we re-define waves as follow:

\[
H_{\text{special, wave, Men}} = H_{\text{topoisomerase-like-wave, Men}}[1 + H_{\text{DNA, Men}}][1 - H^{-1}_{\text{DNA, Men}}] - H^{-1}_{\text{DNA, Men}} \\
= 4\pi T_{\text{tri}} \int d\sigma_1 ... d\sigma_1 \left( Q_{\text{topoisomerase, Men}} E_{\text{topoisomerase, Men}}[1 + Q_{\text{DNA, Men}} E_{\text{DNA, Men}}] \times \[1 - Q^{-1}_{\text{DNA, Men}} E^{-1}_{\text{DNA, Men}}] - Q^{-1}_{\text{DNA, Men}} E^{-1}_{\text{DNA, Men}} \right) 
\]  
(15)

and

\[
H_{\text{special, wave, Women}} = H_{\text{topoisomerase-like-wave, Women}}[1 + H_{\text{DNA, Women}}][1 - H^{-1}_{\text{DNA, Women}}] - H^{-1}_{\text{DNA, Women}} \\
= 4\pi T_{\text{tri}} \int d\sigma_1 ... d\sigma_1 \left( Q_{\text{topoisomerase, Women}} E_{\text{topoisomerase, Women}}[1 + Q_{\text{DNA, Women}} E_{\text{DNA, Women}}] \times \[1 - Q^{-1}_{\text{DNA, Women}} E^{-1}_{\text{DNA, Women}}] - Q^{-1}_{\text{DNA, Women}} E^{-1}_{\text{DNA, Women}} \right) 
\]  
(16)
Replacing waves of (15 and 16) in equation (13 and 14), we can obtain below relations:

\[ H_{\text{special, wave, Men}} + H_{\text{water, Men}} = H_{\text{DNA, Men}} \]  

(17)

\[ H_{\text{special, wave, Women}} + H_{\text{water, Women}} = H_{\text{DNA, Women}} \]  

(18)

Above equations show that there are some special waves that can interact with water and extract it’s DNA-structure from extra dimensions. These waves can produced by mixing topoisomerase-le waves and radiated waves from DNA. For this reason, if we have two waters, one include DNA and another pure and put both of them near a source of topoisomerase-like waves like sun, earth or others, some special waves are produced. These new waves interact with pure water and extract it’s structure from extra dimensions.

IV. SUMMARY AND DISCUSSION

Previously, some scientists have proposed a mechanism that organism can be emerged from special states of water. We have generalized his discussion by regarding the structures of water in extra dimensions. We have shown that water has two DNA-like structures on 11-dimensional manifold. One of these structures exchange the information with DNA of men and another interacts with DNA of women. The shape of two structures are the same in four dimensions and different in extra dimensions. In some conditions, some special waves interact with water and extract the DNA-like structure of it from extra dimensions.

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