

Article

Quantum mechanical methods for advancement of hydrophysical engineering

Jonah Lissner

ATINER Industrial and Electrical Engineering Departments, Israel.; atiner@atiner.gr

Invited Visiting Professor, Center for Mathematical Sciences, Technion - Israel Institute of Technology, Israel.

Received: 10 August 2020; Accepted: 31 October 2020; Published: 2 December 2020.

Abstract: Quantum mechanical mathematical methods are utilized for theoretical engineering and testing of hydrocellular engineering for quantum computation criteria and quantum power engineering.

Keywords: Quantum mechanics, Schrodinger equation, Boltzmann's constant, Shannon entropy, quantum hydrophysics.

1. Introduction and Preliminaries

It is proposed to advance the mechanics of binding energies of vibration of interest for dipole energetics in 1) Ionized water systems and 2) Nonlinear or chaotic computational regimes. Complex water molecule structures of various states of water, similar to microtubulin proteins, or to silicon-based photovoltaic panels, have a morphology of a naturally-occurring micromachine, with the potential to be engineered to make quantum computers, e.g. chemical neural nets, as similarly microtubulins are the intelligent scaffolding for neural computation [1].

The hydrogen bond is an attractive interaction between a hydrogen atom from a molecule or a molecular fragment X-H in which X is more electronegative than H, and an atom or a group of atoms in the same or a different molecule, in which there is evidence of bond formation [2].

2. Proposal and study

Quantum can be defined at $h = 6.62607015 \times 10^{-34} J.s$ for propagation physics of subatomic decoherence and superposition linkages of electromagnetic wavelengths across space and time axes. Entanglement can be defined as any physical network of related, asymmetric action as interrelated, therefore systemic mechanisms such as solutions [3]. A one-cell-buffer of monadic value as a finite-state machine or floating-point unit can be represented [4].

Entanglement in the physical explanation can be understood as a process involving either Quantum-scale or Newtonian-scale physical formula and algorithms. A given water molecule H_2O , and hydrogen bonds, as polar compounds, bonding at 104.48° [5] can essentially be understood as a computational mechanism, in process, but completely physical in nature [6]. This physical mechanism is based upon Bell's Theorem from Shannon entropy where

$$H(x) = - \sum_{i=1}^n P(x_i) \log P(x_i).$$

Demonstrations of quantum tunneling behavior of water have been noted for physical isomorphisms in Chronoelectromagnetogravidynamic [-CEMGD] hypothesis, therefore to define the computational quantum-physical process and mechanics for the hydrogen bond [7], it is necessary to hypothesize that these models as either a kind and type of:

1. Automata computing machine composed of algorithmic strings, therefore quantum-entangled, and/or a kind and type of
2. Automorphic, or monoidal algorithmic string that is solely or atomically quantum-entangled, vis-a-vis the corresponding system. For the intelligent scaffolding hypothesis, Albrecht-Buehler has demonstrated such cellular infrared detection and mechanics to originate in the centrosome and centrioles [8].

3. Materials and methods

Now it is demonstrated in gedanken-experiment that the entire molecule of H_2O and subsequent hydrogen bonds being physical and computational, but without specific analysis of kind of computation proposed or invoked, is based on advances from the simple Radon transform where

$$\begin{aligned} Rf(\alpha, s) &= \int_{-\infty}^{\infty} f(x(z), y(z)) dz \\ &= \int_{-\infty}^{\infty} f((z \sin \alpha + s \cos \alpha), (-z \cos \alpha + s \sin \alpha)) dz. \end{aligned}$$

It is more dimensionally-exact to posit that water molecules are the result of basal quantum entanglement of forces and energetics occurring at Planck scale and then forming energy from energy into local entropic maximals, sending and receiving forms of energetic phases, e.g. mechanical, chemical or electromagnetic in nature at the newtonian, $+nm$ scale. Regarding demonstration of direct testing of these hypotheses, a simple system is proposed for scaling of entanglement processes. There may be weak examples of entanglement at room-temperature at the atomic to molecular scale, and it is proposed at the Planck scale between separable states A and B [Wightman] in a given density matrix for the proposed given the first order of Quantum Entanglement, E_1 :

$$P([\psi], [\phi]) = \frac{|\langle \psi, \phi \rangle|^2}{\|\psi\|^2 \|\phi\|^2},$$

and per Local Quantum Field Theory [LQFT] therefore

$$\frac{\delta \rho}{\delta t} + \nabla \cdot (\rho v) = 0,$$

and regarding the continuum mechanics inherent in quantum entanglement to activate the conjectured Second Order Of Entanglement, E_2 :

$$\gg v(\gg r, t) = \frac{\nabla S(\gg r, t)}{m},$$

c.f. Schrodinger's equation for a single relativistic particle

$$\begin{aligned} i\hbar \partial_t \psi(r, t) &= [-\hbar^2 \nabla^2 + V(r, t)] \psi(r, t) \\ &= \left[\frac{-\hbar^2}{2m} \nabla^2 + V(r, t) \right] \psi(r, t) \end{aligned}$$

4. Results

Macroscopic energy systemics of polarization of simple compound molecules of air at approximately 78% N and 20% O demonstrate future potential technologies e.g. air-based tractor beams [9], pointing to a type of limited macroscale entanglement. These should be defined from

$$|\beta(x, y)\rangle = \left(\frac{|0, y\rangle + (-1)^x |1, Y\rangle}{\sqrt{2}} \right),$$

and extended formulas for the Bell States.

Mathematical physics, Topological Quantum Field Theory [TQFT], Gauge theory, and Quantum mechanics are utilized as system of computation to understand any relevant linkages between quantum to classical systems, e.g. the hydrophysical cellular systems proposed by the Author [Jonah Lissner] as either quasi-ice [crystalline structure] or quasi-vapor [gas structure] states for quantum computation regimes of qubits. There is conjectured a theoretical, historical similarity between Wave-Particle duality debate and the subsequent, Copenhagen-stochastic versus De Broglie-Bohm-Hiley-Bekenstein Holographic Principle [DBBHBHP] quantum field mechanics-discrete, systemic interpretations. It is therefore proposed there be a scale-boundary for clopen wavefunction collapse. This action may in effect be the origin of modes of quantum entanglement in an entropic system or subsystem, and the composition of the ionic bonding values of water.

This is a postulate estimated considering the factor of entropy in the given system and subsystem for the wavefunction collapse at a maximal distribution method from Boltzmann's constant k , at every scale of time-gravity, for the given wavefunction frequency, especially for multibody problems. Based on metrics and formula from the Quantum Vacuum State/Vacuum Expectation Value [QVS/VEV] we can estimate at relativistic speeds of 1 electronvolt

$$p = 1\text{GeV}/c = (1/\text{times}10^9) \cdot (1.60217646 \times 10^{-19}\text{C}) \cdot V / (2.99792457 \times 10^8\text{m/s}) = 5.344285 \times 10^{-19}\text{kg.m/s}.$$

There is a great finite amount of electro-magnetic string landscape energy. In a given water molecule H_2O , there are requirements for efficient energy usage of the entire volume of the water structure. For the requirements to change would point to chaotic regions of physical constants which are not classical, but quantum. Electrical Resistivity Tomography [ERT] has demonstrated advances for the discovery of isomorphisms in Chronoelectromagnetogravidynamic [-CEMGD] regions of the earth releasing energy from seismoelectric and seismogravitic activity [10].

Quantum gravity and quantum chronodynamics are directly correlated to measurable entropy of systems. De Broglie-Bohm-Hiley-Bekenstein Holographic Principle [DBBHBHP] and Wheeler-Feynman have strong points in this debate; strict Copenhagen is supposed as a basis for heuristics and stochastic methods as Von Neumann advanced. Here the Principle of Least Action can be invoked for further study of quantum mechanics of cellular systems, specifically hydrological regimes where

$$L(q, \dot{q}, t) = K(\dot{q}) - U(q, t).$$

Orders of magnitude, in given system domains of power contain variations or automata of physical systems: The quantum scale contains orders of entanglement and probability translated up-ward into constant-entangled systems at scales and parameters of entropy of physical systems, e.g. from Planckscale atoms to the cellular $+nm$ scale being past molecular scale, into molecular chains [H_2O].

These therefore form two major systems strata having internal and external components in continual interrelationship over space-and-time expending and absorbing energy in an exegetics environment. The quantum cellular automata theory can be understood as algorithms of powers or factors of physical constants applied to given systems as heuristics, correct to the extent of such heuristics which being mechanical are part of the mathematical solutions required to understand the actions of quantum probability of systems.

Although there is proof for room-temperature quantum entanglement of photonic streams, it is not scale-free in that the specific pilot-wave has collapsed at a given drop or point of entropy and dispersed its energy at a given system scale of maximum entropy [Point B]. The minimum scale of entropy is the point of diffraction [Point A]. We can see this in the continual reference to such experiments as the Wave dispersement double-slit experiment and requisite string scattering amplitudes for plasmonic field confinement [11]. The mechanisms of scalar changes in entanglement demonstrate that there are too many points of energetic discourse to have a completely scale-free system. The keys of the scale changes are the points of energetic absorption in a given hydrogen bond structures. They are routed cell-to-cell and bond-to-bond across such networked regions.

It is therefore hypothesized to measure the quantum processes of any physical system going past current magnetic resonance imaging. It is given there are many kinds of physical entanglements or energetic interactions occurring at any given time and location utilizing Dynamic Global Workspace Theory-Intelligent Computational System Organization [DGWT-ICSO] of the inherent environmental quantum pathways, given the path of least resistance.

5. Discussion

Now it can be proposed to determine how a water molecule is a quantum-entangled object in this instance. The water molecule H_2O is at the outer physical layer of the given quantum processes occurring around, across, through and beneath it in 4 axes of the spin isomers of H - orthohydrogen [parallel], and parahydrogen [antiparallel]. Therefore the water-cellular model is demonstrated the result of these processes and acts and re-acts in the two-state Newtonian system, which somehow mechanizes from the quantum mechanical states in the greater physical system.

A theory of topological geometry of matrices in topological quantum field theory, is a proposed quantum cellular automata decomplexifying at greater and greater scales toward a temporary local maximum entropy of classical biophysical processes.

$$\begin{aligned}
 H(i,0) &= 0, \quad 0 \leq i \leq m, \\
 H(j,0) &= 0, \quad 0 \leq j \leq n, \\
 H(i,j) &= \max\{H(i-1, j-1) + s(a-i, b)j\} \text{Match/Mismatch}, \quad 1 \leq i \leq m, \quad 1 \leq j \leq n, \\
 \max_{k \geq 1} &\{H(i-j, k) + W_k\} \text{ Deletion,} \\
 \max_{i \geq 1} &\{H(i, j-1) + W_l\} \text{ Insertion.}
 \end{aligned}$$

This model can be demonstrated in Adenosine triphosphate [ATP] cycles as the rule automata are completed, as in Smith-Waterman algorithm.

Marx generators have successfully used N for the spark gap and H₂O as water capacitor to modulate voltage dynamics in the capacitor portion [12]. Chronoelectromagnetogravidynamics [-CEMGD] of water adsorption is proposed as a function of Adenosine triphosphate [ATP] cellular physiology and cell energetics of H₂O adsorption, from electron field transduction mechanisms. Some unified macroscale and quantum physical methods to separate water molecule chains in given water mediums use superconductivity from magnetism or sonic vibration, e.g. Macrosonics, or Supercavitation, to desalinate water, than by forward osmosis or reverse osmosis.

Nikola Tesla studied induced harmonics utilizing the advanced magnifying transmitter with an array of grounding and systems of ionospheric plasma induction, to guide Quantum Vacuum State/Vacuum Expectation Value [QVS/VEV] or Quantum-scale electromagneto-gravidynamics at specific wavelengths from power generation to relay station, as an example of applied geo-physics of lightning storms.

The vacuum state, or exclusion zone, has the properties of propagation as the ionosphere and the subcrust geology, as noted in Tesla’s engineering for advanced magnifying transmission [13]> Regarding Nikola Tesla’s work with Hydrodynamics, heat and mechanics of turbine systems and water adsorption zones, models of exclusion zones can be found in ionospheric, and geological regimes.

6. Conclusion

Regarding water molecule physics, it can be understood that transduction of environmental entropy is slowed down by each molecular bond [14–16]. These mimetics are defined as engineer-ing of differences in energetic values using Boundary Layer Effect utilizing the Von Karman momentum integral, where

$$\frac{\tau_w}{\rho U^2} = \frac{1}{U^2} \frac{\partial}{\partial t} (U \delta_1) + \frac{\partial \delta_2}{\partial x} + \frac{2\delta_2 + \delta_1}{U} + \frac{\partial U}{\partial x} + \frac{v_w}{U},$$

for

$$\tau_w = \mu \left(\frac{\partial u}{\partial y} \right)_{y=0}, \quad v_w = v(x, 0, t), \quad \delta_1 = \int_0^\infty \left(1 + \frac{u}{U} \right) dy, \quad \delta_2 = \int_0^\infty \frac{u}{U} \left(1 + \frac{u}{U} \right) dy.$$

In the case of the water-adsorption zone, the complete water-gas phase is engineerable for water-batteries, water-conduits, water-circuitry, and H₂O molecule-based computation engines with prototypes using engineered materials for transduction. In summary, the gestalt effect of the transduced energy does not overrule the standard theory, but advances the previous theories of nanophysics of Water, and how electrons are transmitted across nm-scale ionic bonds, in given quantum computational regimes.

Conflicts of Interest: “The author declares no conflict of interest.”

References

- [1] MacLennan, B. J. (2004). Natural computation and non-Turing models of computation. *Theoretical Computer Science*, 317(1-3), 115-145.
- [2] Arunan, E., Desiraju, G. R., Klein, R. A., Sadlej, J., Scheiner, S., Alkorta, I., & Kjaergaard, H. G. (2011). Definition of the hydrogen bond (IUPAC Recommendations 2011). *Pure and Applied Chemistry*, 83(8), 1637-1641.

- [3] Richardson, J. O., Pérez, C., Lobsiger, S., Reid, A. A., Temelso, B., Shields, G. C. & Althorpe, S. C. (2016). Concerted hydrogen-bond breaking by quantum tunneling in the water hexamer prism. *Science*, 351(6279), 1310-1313.
- [4] Lissner, J. (2015) Theory for Determining Energy Value in Nanometric Biophysical Systems. *Astrobiol Outreach*, 34, 1000141.
- [5] Hoy, A. R., & Bunker, P. R. (1979). A precise solution of the rotation bending Schrödinger equation for a triatomic molecule with application to the water molecule. *Journal of Molecular Spectroscopy*, 74(1), 1-8.
- [6] Ji, L., Gao, J., Yang, A. L., Feng, Z., Lin, X. F., Li, Z. G., & Jin, X. M. (2017). Towards quantum communications in free-space seawater. *Optics Express*, 25(17), 19795-19806.
- [7] Sweetman, A. M., Jarvis, S. P., Sang, H., Lekkas, I., Rahe, P., Wang, Y., & Moriarty, P. (2014). Mapping the force field of a hydrogen-bonded assembly. *Nature Communications*, 5(1), 1-7.
- [8] Albrecht-Buehler, G. (1994). Cellular infrared detector appears to be contained in the centrosome. *Cell Motility and the Cytoskeleton*, 27(3), 262-271.
- [9] Shvedov, V., Davoyan, A. R., Hnatovsky, C., Engheta, N., & Krolikowski, W. (2014). A long-range polarization-controlled optical tractor beam. *Nature Photonics*, 8(11), 846-850.
- [10] Shen, X., Zhang, X., Wang, L., Chen, H., Wu, Y., Yuan, S., & Ding, J. (2011). The earthquake-related disturbances in ionosphere and project of the first China seismo-electromagnetic satellite. *Earthquake Science*, 24(6), 639-650.
- [11] Piazza, L. U. C. A., Lummen, T. T. A., Quinonez, E., Murooka, Y., Reed, B. W., Barwick, B., & Carbone, F. (2015). Simultaneous observation of the quantization and the interference pattern of a plasmonic near-field. *Nature Communications*, 6(1), 1-7.
- [12] Wang, X. (2019). Research at Tsinghua University on electrical explosions of wires. *Matter and Radiation at Extremes*, 4(1), 017201.
- [13] Soper, A. K., & Benmore, C. J. (2008). Quantum differences between heavy and light water. *Physical Review Letters*, 101(6), 065502.
- [14] Tesla, N. (2002). *Nikola Tesla on his work with alternating currents and their application to wireless telegraphy, telephony, and transmission of power: an extended interview*. 21st Century Books.
- [15] Acton, M., Brickman, K. A., Haljan, P. C., Lee, P. J., Deslauriers, L., & Monroe, C. (2005). Near-perfect simultaneous measurement of a qubit register. *arXiv preprint quant-ph/0511257*.
- [16] Dedic, J., Okur, H. I., & Roke, S. (2019). Polyelectrolytes induce water-water correlations that result in dramatic viscosity changes and nuclear quantum effects. *Science Advances*, 5(12), eaay1443.



© 2020 by the authors; licensee PSRP, Lahore, Pakistan. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).