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Unified Theory of the Five Forces Adding the Fifth-Force by Pico-Hydrogen-Like Particles in the Water

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ABSTRACT

We reported the hydrogen bond dissociating water, which we name MICA and SIGN water involving the presumed particle of infoton, <H+~ e- > formed by pressurization of tap water. We summarized the basic properties of both waters. The water obtains the smallness, reducibility, nuclear change in cesium and tritium, movement of particles, and emission of far IR through THz electromagnetic waves. These properties in the infoton unifies the five forces in every function. We tried the visualization of the water. We can explain every experience in daily life more than ten years corresponding to the basic infoton's essence.

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Introduction

The four forces have not yet been in the physics world. Back to the history of basic physics, Albert Einstein attempted to unify the general theory of relativity with electromagnetism [1,2]. In early 20st century, quantum mechanics implemented the Standard Model describing the three non-gravitational forces, namely; strong nuclear, weak nuclear, and electromagnetics force associating a particle smaller than an atom, atoms, molecules, etc. A unified field theory (UFT) is usually regarded fundamental forces and elementary particles written in terms of a pair of physical and virtual fields.

Forces are not transmitted directly between interacting objects but instead are described by intermediary entities or the substance which we treat. We call the entities and the substances "fields" depicting physical quantity. Earlier attempts based on classical physics are described in the article on classical unified field theories.

The classical unified field theory was developed by J. C. Maxwell, and H. C. Oersted discovered that electric currents exerted forces on magnets. After that M. Faraday found that time-varying magnetic fields could induce an electric current. Maxwell published the famous paper on a dynamical theory of the electromagnetic field in 1864 [3].

The Maxwell's dynamical theory was the first example of a theory involving previously separate field theories; electricity and magnetism to unify the theory of electromagnetism. Then A. Einstein had used the constancy of the speed of light in Maxwell's theory to unify a space and time into an entity of spacetime. One is the special relativity to a description of gravity; generally, relativity employing a field to indicate the curving geometry of four-dimensional spacetime. H. Weyl introduced the concept of an electromagnetic gauge field in a classical field theory then T. Kaluza extended general relativity to five dimensions. In Kaluza-Klein theory, the gravitational curvature of the extra spatial direction behaves as an additional force like an electromagnetism [4,5]. Other models of electromagnetism and gravity were pursued by Albert Einstein in his attempts at a classical unified field theory. The classical unified system includes the weak and strong nuclear forces to get the Einstein–Yang-Mills–Dirac System [6].

The new ideas have been developed; namely, the quantized spin-2 field on the standard commutation relations, a partially unified electroweak theory, then a particle physics developed like quarks, hadrons, and gluon in the strong interaction in 1960s. Their theory was first given experimental support by the discovery of weak neutral currents in 1973. In 1983, the Z and W bosons were first produced at CERN (The European Organization for Nuclear Research) [7]. We experience a high energy physics as a particle physics since then. This unified theory modelled the electroweak interaction as a force mediated by four particles; the photon for the electromagnetic aspect, a neutral Z particle, and two charged W particles for the weak aspect. As a result of the spontaneous symmetry breaking, the weak force becomes short-range and the W and Z bosons acquire masses of 80.4 and 91.2 GeV/c2, respectively. As shown here, the particle physics exists still such a high energy scale employing a current accelerator.

There are many researches in particle physics until present time. So, we do not refer all of them since our purposes here are to establish the basic sciences as well it's application of water itself. Here we report low energy physics of water which we have an experience for our environment on the earth. We name the water MICA (Minimal Catalyst---2009), and SIGN water (Spin Information Gauge Network) [8]. We presume an elementary-like particle named "infoton" in the SIGN water, but the "infoton"

did not necessarily relate to water when I registered in patent [9]. The theme here are the infoton's functions of pico-hydrogen-like particles in the MICA water and SIGN water, although we explain the difference of two waters in the next section.

Material and Methods

We employ usual tap water as a control, and a sample is the pressurized one at more than 100 MPa. And MICA water was pressurized 3 MPa. The pressurized water is supposed to be dissociation of some clusters in usual water.

We consider the pressure difference is the containing rate of infoton after pressurization, although the essential properties are not different. The MICA water and the SIGN water involve about 60 % and more than 90 %, respectively, by the H-NMR measurement. Our basic measurements of water are FTIR (Fourier Transfer Infrared Spectroscopy), H-NMR (Hydrogen based Nuclear Magnetic Resonance), and SQUID (Superconducting Quantum Interference Devices----0□50kOe), although the last one is for magnetism we don't report here.

Furthermore, we employ the element analysis for nuclear transmutation for ICP-mass (Induction Coupled Plasma) and ICP-AES (ICP Atomic Energy Spectroscopy). The FTIR is focused on the far IR and terahertz regions of weak energy.

Results and Discussion

Theoretical Approach

We indicate the hydrogen bonds dissociation of two water molecules according to the computer simulation based on a quantum mechanics treatment of the perturbation method [10].

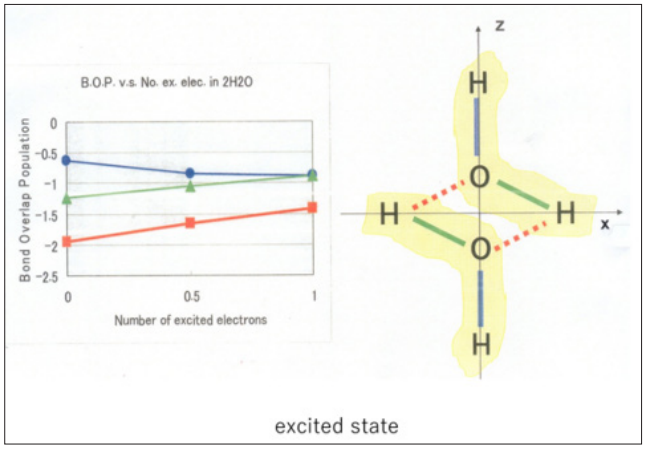

Figure 1: Computer Simulation for Electronic Structures of Two Water Molecules and Supposing Dissociation of its Hydrogen Bonds Showing Electron's Overlaps

As shown in Figure 1, the blue lines and green lines may break resulting in two hydrogens. We suppose one hydrogen is an infoton, <H+~e->, because of the hydrogen bonding strength of about 0.3 eV, so we may have two infotons after dissociation of two water molecules.

General Stories

We do not necessary to discuss a particle physics like quarks, hadrons, and gluon in the strong interaction more than that, but we introduce the neutron and proton to form a new element.

Firstly, we introduce four forces like electromagnetic interaction; the interaction acting on electrically charged particles. And strong interaction in a nuclear force, the third one is weak interaction associating with a short-range interaction responsible for radioactivity. Here this relates to decay of radioactive cesium acting on electron, neutrinos, and quarks. It is mediated the W and Z bosons. The fourth one is gravitational interaction which is a long-range attractive interaction working with all particles. The postulated exchange particle has been named the graviton which has not been found yet, although gravitational wave prophesied in 1916 by Einstein was detected by LIGO (Laser Interferometer Gravitational-wave Observatory --- U.S.A)in 2015 [11].

Field is said to mediate all four of the known essential forces which is the standard model of particle physics resulting from the exchange of gauge bosons. Electroweak interaction defines Weinberg-Salam theory associating with the weak interaction and electromagnetic interaction [12].

More aspects of particle physics must be complex and progressed, although we introduce only proton decay explained in later section. The proton is about the hypothetical decay of nucleons (protons or neutrons) into other subatomic particles. For the type of radioactive decay of cesium in which a nucleus ejects a proton.

Characteristics of Infoton

We report what functions of infoton possesses explaining every specialty.

Before it, we presume infoton may relates to four forces;
i) Electromagnetic interaction where the infoton itself shows in <H^+~e^->.
ii) Strong force may associate with nuclear change with the infoton shown in later.
iii) Weak energy; this is also nuclear change of radioactive cesium; β-decay.
iv) Gravity force relates to nuclear change shown in later.
iv) The fifth force indicated in the article title meaning the field, which the infoton creates with transferring in a space. We discuss it later and stress on its precession.

Pico-Elementary- Like Particle and Stability of Infoton

Plant growth is faster, growing lager, sweet of fruits by chlorophyll activity due to easier absorption of water through the roots.

Here may be one of evidence of the smallness by laser transfer; Laser light indirectly indicates transfer of infoton. We can realize the straight thinly in the right photo in Figure 2; The laser light can flow between the particles, since SIGN water is smaller.

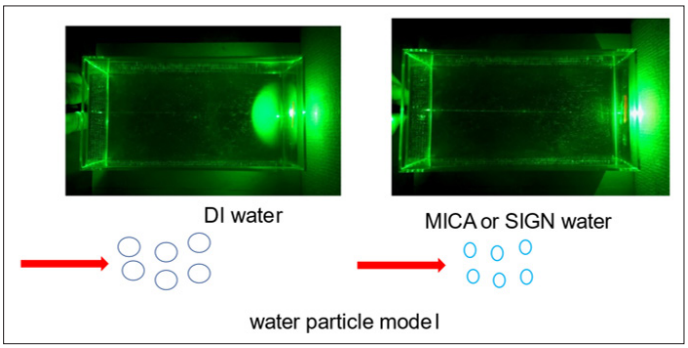

Figure 2: Estimation of Smaller SIGN Water Particles with Laser Light

Then, the infoton maintains energy and mass conservation laws, and stability keeps always for seven years in a room temperature, because we can drink and no algae, and no change with H-NMR measurement [13,14].

Reducibility

Firstly, reduction is well known in the chemistry and biology. The outer orbital electrons involve reduction in an atom. Namely, the atom or the molecule gives some electrons to another substance. The infoton has reducibility. Therefore, the infoton protects rot. We have reported many evidences with experiments in a rot protection of mushrooms, and keeping food fresh [15].

We can justify the oxidation-reduction state of the substance with the ORP measurement device, and use litmus paper test (6.7~7.1) roughly. In the principle, hydrogen electrode is based on the electrochemical potential of hydrogen ion (H^+) and H_2 gas following reactions; hydrogen electrode potentilal indicates according to Nernst equation (1). Ox + $Z_e \rightarrow$ 1/2 H_2, and the equation of measurement is following;

$$E = E^0 + \frac{RT}{F} \ln \frac{a_{H+}}{(p_{H2}/p^0)^{1/2}} \qquad (1)$$

E^0: Standard Electrode Potential
R: Gas Constant
T: Temperature (K)
a:Activity in Reduction and Oxidation
F:Faraday Constant = 96 485 C mol^{-1}
p^0 =101.3×10^3 Pa
p H2 = Partial Pressure
a H+ = Hydrogen Ion Activity in Electrolyte Solution

Oxidation-Reduction Potential is one of visualization evidence for the water condition; the spectrographs are shown in Figure 3. The vertical axis shows voltage so that we can justify more hydrogen gas generation according to the Eq. 1 in the case of water electrolysis.

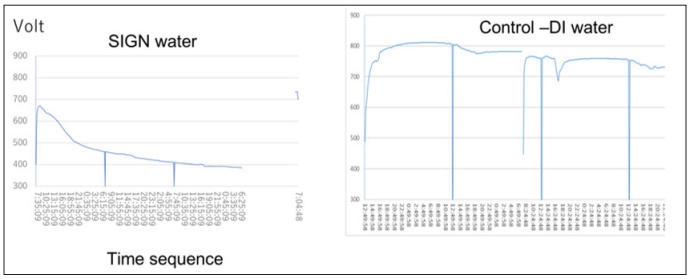

Figure 3: ORP Spectrographs of the SIGN Water and Deionized Water

Nuclear Changes

The reducibility is based on the outer electron in an atom, then the essential point of the nuclear changes occur in atomic nucleus usually, at the same time the outer electron changes. We reported the radioactive cesium changes to the stable barium in the Fukushima contaminated soils and withered plants in 2013~2018 [16,17]. Since then, the pico-elementary-like water can perform nuclear transformation under the room temperature without any external forces. Then, we discuss that it is worthwhile to note the following explanations when RI atom accesses another nucleus. In the theoretical discussion, we propose the involvement of the Einstein gravity equation and the Yukawa potential for nuclear change. These are the following two equations; The former involves an Einstein tensor ($T_{\mu\nu}$) in the equations, and $T_{\mu\nu}$ means energy・momentum tensor, G: universal gravitation, and c is light speed;

$$\int dN/N = -\lambda \int dt + \int (8\pi G/c^4)\, T_{\mu\nu}\, dt \qquad (2)$$

$$\int dN/N = \{-\lambda t + (Mv/d^2)\} \int dt + \int (8\pi G/c^4)\, T_{\mu\nu}\, dt \qquad (3)$$

The Eq. (3) includes the Yukawa potential in the first term, Mv/d^2.

Where infoton's velocityv, assumed to be 10% of velocity of light, and infoton's mass, M, $<H^+\sim e^->$, is 1.6738×10^{-27} kg. The value of d describes the distance between the nucleus and infoton approaching the nucleus, and the second term in Eq. (3), is constant. We define that $\lambda t + (Mv/d^2)$ is the infoton's coefficient. Figure 4 describes the results of calculation assumed as the infoton's coefficient,1.53 according to Eq. (2). We expect the radiation reduction of tritium by treatment with SIGN water applying the theory, although we do not have a chance to evaluate it experimentally.

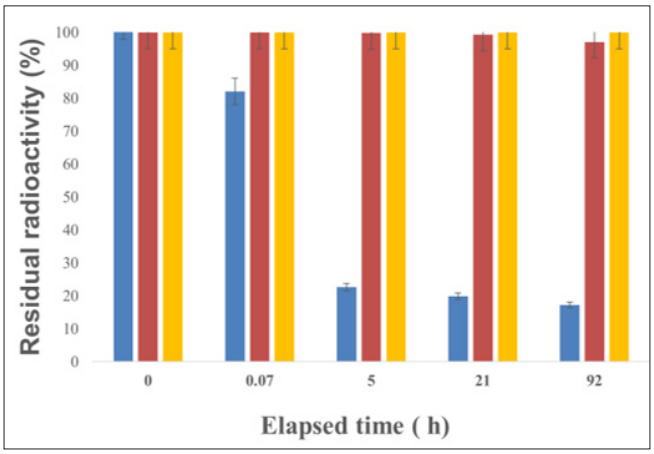

Figure 4: Theoretical Estimation of Spontaneous Decay and Experimental Residual Radioactivity of the Fukushima Contaminated Soils Performed with the Mica Water

Then, we try to propose the assumption following,

$$^3_1H + <H^+\sim e^-> \rightarrow {}^4_2He \qquad (4)$$

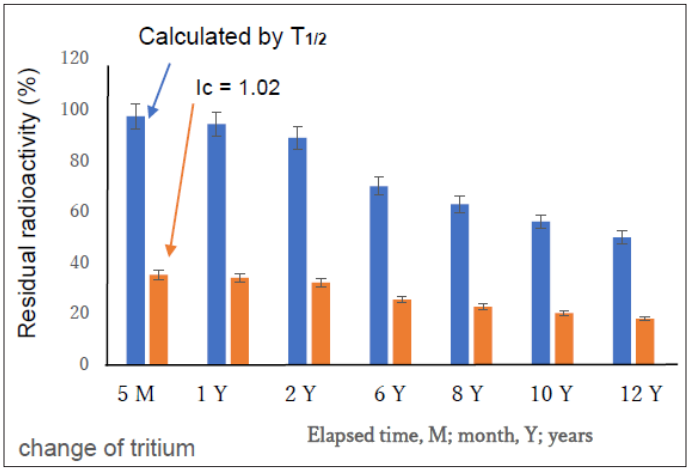

Figure 5: Estimation of Nuclear Change of Tritium by SIGN Water and Spontaneous Decay

We are now going to evaluate the reaction to form helium and lithium in experiment.

There is another interesting result of the nuclear change. The purple non-sulfur bacteria reduced radioactivity to generate the stable barium from the Fukushima contaminated weeds; We estimated the bacteria generated the hydrogen like the infoton, <H^+~e^->, leading to barium discussed previously [18].

Movement of Infoton -- Creation of Field

The infoton atributions are a spin with the angular momentum along with precession leading to move back or forward like a spinning top in Figure 6. Furthermore, there is information transfer by its movement, although we don't know yet what the information is.

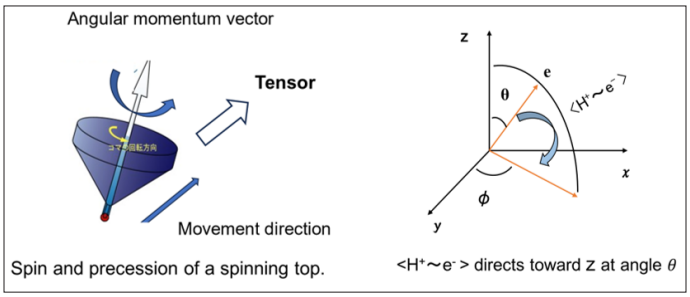

Figure 6: Infoton's Movements Estimation from a Spinning Top, and Geometric Analysis in the Right

Figure 6 depicts the idea of infoton transferring in tensor not vector, where its movements is supposed the non-localized fields [13,19]. Yukawa discussed the weak coupling between local fields, namely "irreducible fields and their interaction" in quantum theory of non-local fields, part II [13]. We guess the non-local field is a gauge field which the infoton create shown later. We consider the infotons generate the fields by their movement themselves in a tensor shown in Figure 6. Relation of centrifugal force and mass of the infoton with its spin may generate the precession representing a tensor (a variety in direction) showingθand Φ in the right of Figure 6. The precession plays a role of the transfer.

In historical, a particle's movement is indicated by Schrödinger wave function, then Dirac developed the wave equation to relativistic theory of the electron, although we do not introduce it here [20].

We try to propose the new particle equation including an angular momentum and fields instead of a wave equation;

$$\frac{d}{dr}\left\{r^2\,\frac{dR}{dr}\right\}+\frac{2mr^2}{\hbar^2}\left\{E\;-V(r)\;-\frac{\ell(\ell+1)}{2mr^2}\hbar^2\;\right\}R=0 \tag{5}$$

ℓ indicates an angular momentum and V contains gauge field, although we do not discuss the detail here.

Emission of far IR and THz Electromagnetic Waves from Infoton

We discuss specific information type of the water is the terahertz (THz) and far- infrared (F-IR) emissions [15]. We measured dielectric constant of MICA water in 2009, which was 0.7 approximately. The dielectric constant of usual water is one [21]. The value of 0.7 corresponds to better electric conductivity, and spectroscopies showed transparency of electromagnetic wave between 0.6 to 5 THz associating with the plasma frequency between H+and e- in the infoton. The frequency corresponds to far IR ~ THz [22].

Conclusion

We reported the hydrogen bond dissociating water which we name MICA and SIGN water involving the presumed particle of infoton, <H+~ e- >. We summarized the basic properties of both waters. The water obtains the smallness of pico- hydrogen-like particles, reducibility, function of nuclear change, transfer, and emission of far IR through THz electromagnetic waves. These properties in the infoton unifies the five forces in every function. We tried the visualization of the water. We can explain every experience in daily life more than ten years corresponding to the basic infoton's essence.

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