

High Spin State Water

White paper by **Dan Nelson**
November 2009
www.waybackwater.com



STABLE HIGH SPIN STATE WATER

The simple explanation of what the fundamental essence of water is strongly suggests errors in reasoning. Misconceptions have guided literary and scientific discourse all through history. The problem, as I see it, lies with the making of assumptions about a substance (water) whose constituent components cannot be seen interacting. We know the H₂O molecule is involved. Beyond that, I am compelled to challenge all the assumptions made about water. The inference drawn from known data derives a conceptual portrait leading to even more confusion and questions.

‘What is water? Most would reply that water is H₂O. I disagree! It takes H₂O to make water, and that is fundamentally different. If one thinks about the array of unique properties and qualities inherent in water, just being H₂O is insufficient conceptually and practically. Let’s consider a few examples of characteristics possessed by water to illustrate this.

Water’s density or weight in its liquid phase is such an example. Even at four degrees centigrade, how could the H₂O molecules become so densely packed together to account for water’s weight per unit volume? Think about it. Adding the (rounded off) atomic mass of oxygen [16] plus the atomic mass of two hydrogen [2] yields a molecular atomic mass of [18]. Consider the atmospheric gases, oxygen as O₂ [32], nitrogen as N₂ [28], carbon dioxide as CO₂ [44], and methane as CH₄ [16] to name a few. Then, we must consider two aspects of the density of liquids and gases which are defined identically. First, the weight density for both is expressed as mass density in kilograms per meter cubed, multiplied by acceleration in meters per second squared, applied to the sample. And second, the particle density is the number of moles of molecules per meter cubed in a sample. (1 mole is equal to 6.02 x 10²³ particles.)

Gases can be compressed to several atmospheres of pressure. Water is not compressible. Yet, a container which will hold four liters of water will weigh substantially more than a four liter cylinder of air at several atmospheres of pressure. Why? Do H₂O molecules, at 1 atmosphere of pressure, exist in closer proximity to one another than molecules of gas compressed to several atmospheres of pressure? Do the relatively simple math outlined in the previous paragraph and the weight and density of water

become even more mysterious. Water must have internal structure and mechanics significantly different than those of a gas.

I have pondered this over a great deal. I realize that the conclusion I have reached is inescapably controversial. There must be a fundamental flaw in our understanding of what a liquid is versus what a gas is. Water occupies a liquid phase or is a liquid because its compositional nature is vastly different than molecules occupying a gaseous phase. If the H₂O molecules are assumed to be independent, unattached and free to assume the same mobility characteristics as molecules in gases, the conventional understanding fails the tests of logic and calculation.

There is another attribute of water which I have been pondering for many years. That attribute is its refractive ability. I procured my first telescope fifty-five years ago and I have been actively involved as an amateur astronomer since that time. Currently, I possess two very high quality refracting telescopes (5" and 7" APO's – three element objective lenses) and am engaged in advanced research in wave propagation theory.

A slight modification of our current understanding of what causes different media (all of them being transparent and solid except for water in its liquid phase) to exhibit refractive properties is in order. I don't disagree with the fact that light loses a certain amount of velocity when it passes through various media such as glass, quartz, diamond water as ice and water as liquid. Nor do I have a problem with Snell's law which tells us the extent to which a ray is bent at the boundary between two substances having different indices of refraction. My problem is with the fact that different media possess different refractive indexes with no adequate explanation as to why that is true. The internal mechanics within the various refractive media is obviously somewhat different. What do they have in common? They are transparent (clear) allowing for light transmission through them. But, what accounts for the difference in refractive index? All of these substances have atomic or molecular structure which defines them as crystalline! The particles which comprise the light transmission medium must be arranged in an appropriate geometric pattern and therefore build a regular crystal lattice. Light passes through an organized system of particles (as crystalline lattice) with very little loss in energy. Every medium with refractive properties is a crystal. Did I just suggest (bluntly state) that water in its liquid phase has a crystalline structure? I believe I did! This is the juncture in my paper where I must encourage you to entertain the possibility that an obvious and fundamental fact relative to water has been right under our noses all along; a truth so simple and yet not so obvious. But the important and exciting possibility which has yet to be considered pertains to whether water is susceptible to having its properties manipulated through sophisticated engineering methods.

Consider also the thermal (heat transference) properties of water. What occurs if water is considered in the light of thermodynamics?

The science of thermodynamics involves the movement of heat; the reversible transformation of heat into other forms of energy such as mechanical energy in the cylinders of your car engine. The first law of thermodynamics deals with the conservation of energy. When any quantity of energy disappears in one location or under a specific set of conditions, an equivalent amount of energy must appear elsewhere in the same system, even if converted into a different form of energy. Energy can never simply disappear – it must be conserved.

Commonly referred to as the entropy principle, the second law of thermodynamics is the degradation of the total energy in a system. An example would be the observation that energy, as heat, always flows from a body of higher temperature to one of lower temperature. Normally, entropy would be a macroscopic variable describing a bulk property of matter, a quantitative measure of how disorganized (degraded) a physical system is. So the second law says: for any closed system, the entropy (magnitude of disorganization) always increases.

James Clerk Maxwell, a Scottish physicist, developed a kinetic theory of gases in 1859, which was based on statistical averages. His was a method by which the macroscopic properties of a volume of gas molecules could be predicted from a microscopic model. This led to the important probable velocity distribution of the gas molecules, based on his model, which is the range of velocities or how the whole collection of molecules deviates from the kinetic average. The probability velocity of a random gas molecule could be computed assuming three conditions are met. They are:

1. The particles are mutually independent of each other.
2. The particles interact randomly with no preferred direction.
3. The particles are free to move uniformly in space.

Less than two decades later, Maxwell's work inspired Ludwig Boltzmann to apply statistical probability calculations to any collection of particles, which met the same three conditional criteria. However Boltzmann clarifies and expands upon the second law by formalizing the theorem of the equipartitioning of energy, which by virtue of the theorem's probability basis makes Boltzmann the father of 'statistical mechanics'. His insight into energy was that it would be shared equally among all degrees of freedom when the system reaches thermodynamic equilibrium. In other words, a molecular system initially exists in a less probable state and then approaches a more probable state when it is agitated by heat or mechanical vibration until it reaches thermal equilibrium – its most probable state – the entropy is now at maximum. Through logical reasoning, mathematically supported, it is obvious that the law of entropy increase is statistical, not absolutely certain.

So, how does the above information apply to our topic of stable high spin state water? The spin state is calibrated against the background of the thermodynamic efficiency (status) of water. Thus, the thermodynamic efficiency of water is its current energy state and equivalent to its spin state. Therefore, high spin state water is water in its lowest probability state; water as far removed from thermodynamic equilibrium as possible.

As I have already stated, a careful analysis of the unique properties and attributes of water strongly suggests internal structure and mechanics which are far different than those of a gas. It is not logical that water represents a random collection of independent molecules. It has heat transference properties, movement and density characteristics far different than the atmospheric gases mentioned in paragraph three. As mentioned in paragraph six, water possesses a unique refractive index which strongly suggests internal structure of crystalline nature. The inescapable conclusion is this: water is non-conforming to the first two of Maxwell and Boltzmann's three computational conditions for a random and mutually independent collection of particles. Why is this so?

I will postulate a model which I believe is a more fundamentally accurate and workable understanding of water and will necessarily evoke modifications of some concepts and mechanical models which science

has held as valid and true for a considerable period of time. While it's not my intent to cast aspersions at others' efforts/ideas or to commit chemistry heresy, it sometimes amazes me when I delve into various problems only to be confronted with notable gaps between available data and the often times tenaciously held, though erroneous, assumptions held by other scientists and the more probable hypothesis waiting to be put to the test.

Before going into specific delineation of my revised model of water, a brief discussion of atomic/molecular scale and structure is appropriate at this juncture. Because the laws of quantum theory only allow us to estimate the size of atom at approximately 1/10 of a nanometer ($1\text{\AA} = 1$ angstrom) or one part in one millimeter divided into ten million parts, that left me some room for differences which came out of my calculations. Those calculations made allowance for atoms slightly smaller and perhaps even half that size at 0.5 angstroms. Both the hydrogen and oxygen atom (in fact, all atoms) are extremely similar in size at that scale. The simple water molecule would thus weigh in at plus or minus one angstrom in size. Water, as a tri-atomic molecule, is formed by the need for oxygen to acquire an additional electron pair. This is referred to as an electrovalent bond, or (more commonly) as an ionic bond. In this highly stable (lowest energy) electronic configuration, water represents one of the simplest electric bi-polar charge fields in existence. As an unattached / independent / uninvolved (ground state) water molecule, the bond angle between one hydrogen, the oxygen, and the second hydrogen would be 104.5° . To fully grasp my revised model of water, one must be aware of the theoretical work of the German physicist Arnold Sommerfeld and his law for doublets. His insight was that two elements, in forming a bond, would share their electrons in such a way that they would have eight electrons parked in their highest energy levels, a total of four electron twins (pairs). So, oxygen has one electron pair in its innermost shell and three pairs in its outermost shell for a total of four pairs or eight electrons. When bonded with two hydrogen atoms, the oxygen acquires an additional electron pair in its outermost shell for a total of eight electrons to fulfill Sommerfeld's requirement. (This is also known as the octet rule or Lewis-Langmuir theory named for two American chemists.) When bonded with two hydrogen which each contribute one electron to oxygen's outermost shell, the combination represents the most stable energy state for both elements.

Even more fundamental to my revised water model is the fact that electrons exist in their shell with one of four quantum numbers (s, p, d or f) which my work correlates with spin axis orientation. This is not to be confused with Pauli's exclusion principle. In 1924, physicist Wolfgang Pauli proposed that no two electrons can be in the same quantum state. In helium, with two electrons in the lowest orbital, one electron is allowed to join (pair) with the other only if it spins in the opposite sense to its partner. My proposal is that spin axis orientation, with reference to the atom's nucleus, is the foundation for the four quantum numbers. Electron pairs must share the same orientation of their spin axis while having opposite spin. Bearing in mind that electron spin is the quantum analogue of classical spin or rotation of some object about an axis, opposite electron spins have the effect of zeroing out the g-factor (number expressing the electron's magnetism) while building the characteristics of the electric force field around the atom. The electric (Coulomb) field varies quantitatively according to s, p, d or f spin axis orientation.

So, Sommerfeld knew that when one oxygen combined with two hydrogen, they would share their electrons so as to have eight at their highest energy level; four electron pairs. But, the four electron pairs are not the same. Three are p-electrons. The fourth is an f-electron pair (on loan from the two hydrogen atoms). If we put this into the context of what's known about the atomic world according to the principles of quantum mechanics, this leads to a curious phenomenon.

First thing to consider is magnetism. It is a well-known, established fact that the H₂O molecule is ever so slightly magnetic. It has a permanent dipole moment or bi-polar charge field which somewhat increases the probability of particle interaction. The oxygen atom with its full complement of electrons in electron shell number 2 displays negative charge characteristics. The hydrogen atom nucleons group together in rather close proximity separated by 104.5° for what I refer to as water in its most probable state. However, there exists an even stranger molecular property which greatly increases the probability of particle interaction.

What kind of particle is an H₂O molecule? Assuming that we are dealing with oxygen-16, there are a total of 8 protons, 8 neutrons and 8 electrons. All these particles are classified as fermions. They are identical quantum particles whose state acquires a negative sign when the particles are exchanged. The mathematical property of the quantum state of fermions is antisymmetric. Fermions obey the Pauli exclusion principle so that no 2 identical (spin ½) fermions can be in exactly the same quantum state. Fermions are strongly interacting particles. So, because of the obvious condition of all the electrons running as pairs, we would say that the electrons are in an entangled state so neither has a state of its own. but the pair does. In this entanglement of a pair of spin ½ particles, we have a resultant or total spin 0 state. But, how should we think of the entire H₂O molecule? Like a helium atom or photon. These particles are classified as bosons whose states do not change when the particles are exchanged. All bosons tend to be in the same state. The mathematical property of the quantum state of bosons is symmetric. The H₂O molecule definitely obeys the particle swap rules for bosons.

I have designed a simple but elegant test for determining the difference between particles in a symmetric boson state and particles in an antisymmetric fermion state. The particles in these two states display a subtle but discernible effect on the local gravity field. Analysis of electrons moving through a conductor as well as hydrogen gas (not in motion) give identical results. Opposing, but identical results, derive from an analysis of a 500mW laser beam and helium gas (also not in motion). Temperature and atmospheric pressure were the same for all tests. Interestingly, when water was subjected to the same test criteria as the above, it gave the same results as the two boson particles – photons and helium atoms. Samples of water from different sources (different sets of environmental circumstances) and purified (filtered, distilled) by a variety of means gave identical results.

Bosons are in the same quantum state. They are “gregarious” because of this state and their affinity for each other gets stronger the more bosons cluster together. What is responsible for this effect? The outer electron shell of the H₂O molecule possesses a high gradient of virtual particle exchange. This quantum electrodynamic effect coupled with weak magnetic urging attracts the molecules together such that the oxygen atoms seek positions in proximity to an equilibrium center. So, it’s not the permanent dipole moment attribute of the H₂O causing these particles to explore intimate/close relationships to their identical boson partners. Rather, it’s the electric force field or zero-point energy exchange property of the four outer electron pairs. The atoms are already in a combination representing the most stable energy state for both elements. How would these stable particles interact? They would do so by forming the most stable and symmetric structure possible.

This brings our discussion full circle and back to my revised model of water. The preponderance of evidence, thus far, tells us that h₂o molecules seek out close relationships of a symmetric-crystalline nature. They are forming polyhedron. This is the only plausible structural state which can account for all of the unique attributes and qualities of water. The polyhedral structures constitute even larger, more

involved boson particles. An example of such a particle would be a dodecahedron with 12 interlocked and extremely stable pentagonal rings with 20 H₂O boson particles occupying the nodal points. Oxygen always sets up on the inside of this structural framework with the two hydrogen nucleons in the diametric opposite of the polyhedron's center. With the positive electric charge predominant on the exterior of the boson particle, an interesting property emerges. We are familiar with clustered, non-moving electrons creating a static negative charge field. The water boson carries an electro-positive field. Not only are the bosons prone to cluster at a minimum separation of 3 angstroms which is the mechanism responsible for the surface tension of H₂O and its bulk density, but the positive electrostatic field effect makes H₂O very attracted to other surfaces such as proteins. This effect is the equivalent of electron build-up on various surfaces.

A limited number of structures would be allowed. Only polyhedra whose total boson compliment is divisible by 4 are possible. The number of bosons involved determines the geometry of the resultant boson particle. Particle geometry is critical. The smallest stable water particle (polyhedron) would consist of 4 boson particles arranged in a tetrahedron configuration. Another allowable particle would be a modified cube (hexahedron). If you arranged four tennis balls as a square, instead of stacking the next four directly above the bottom four rotate the top four 45° such that each ball nestles between the two above or below it. Other particle configurations would exist beyond the dodecahedron with one of them consisting of 64 bosons and the next at 160 bosons.

As previously mentioned in paragraph six, water may be amenable to some manipulation or engineering. Everything thus considered really comes down to this important aspect. Understanding the true nature of water and changing its characteristics are very different topics. Paragraph twelve entangles the thermodynamic efficiency and current energy state of water with its spin state. The different polyhedron structure sizes and geometry are a direct result of the spin state of these crystals. Spin state relates directly to the energy density gradient of the virtual particle field exchange from both the outer oxygen electron shell and the hydrogen nucleons. Virtual interaction between zero-point energy and both oxygen and hydrogen fields is balanced and reciprocal. Any change in the gradient of one stimulates a reciprocal response in the other. It occurred to me over twenty years ago that it might be possible to develop a virtual laser which would facilitate a variation in the energy gradient in either the negative field of the oxygen or the positive field of the hydrogen nucleon compliment. Photons, either "real" or "virtual", obey the same swap rules for symmetric boson particles. Conventional lasers work because of this principle. The more photons you can pack together, the better. As it turned out, there was only one approach to engineering the spin state of water. Manipulation of the gradient of the hydrogen protons actually results in a change of the bonding angle between the two hydrogen nucleons and their ionic bonding partner. Thermodynamic efficiency (spin state) is highest when the bonding angle is at a maximum of 122°. Field exchange gradient is optimized at this angle for both positive and negative charge fields. The bonding angle thus becomes the determinant of the thermodynamic status of water. The bonding angle controls polyhedron size and its geometric expression. All of this is possible because of one simple operation. When the bonding angle is changed, the dipole moment is changed. Dipole moment, as a variable, is the hidden factor in water thermodynamics.

Attached to an environmental context, the water particle will reflect the thermodynamic status of imposed conditions. These conditions tend toward the most probable state. Also, these conditions have

no bearing on kinetics and so are independent of temperature, pressure or other inherent factors. I need to qualify the previous sentence. If water is free to move without constraint, it acquires energy from zero point in its immediate environment. We are referring to water in a relatively stable temperature range. The increased temperature of water should produce the same effect by imparting greater kinetic energy to the particles. Does it? No. That energy is exchanged back to its environment very quickly as heat exchange. Under the vast majority of existing conditions, particularly laminar flow (i.e. movement through pipes or confining underground aquifers), water experiences negative thermodynamic fluctuations. Water particles, under these thermodynamically degrading conditions, shift their bonding angle to 109° with an immediate change in polyhedral geometry. This polyhedron constructed of 160 H₂O molecules, resembles a geodesic dome approximately one micron in size. Between 95% and 98% of all the polyhedra in any bulk quantity of surface or inter-crustal water will exist in the higher probability micron configuration. The remaining 2-5% of total polyhedra are in a lower probability state and exist as a nanometer size polyhedron with a bonding angle of 114° .

The polyhedra of water are marginally more independent of their neighbors than their molecules locked into the polyhedron structures themselves. Subsequently there does not exist the independence and randomness of motion within bulk quantities of water that exist in gases. The cohesive forces are great enough to hold the polyhedra in close proximity, from 4-70 microns separation depending on kinetic energy (temperature – motion) acquired by the bulk system. The proximal positioning locks the polyhedra together in a state of vortical/vortex motion; like ball bearings rolling about one another and yet not allowed to stray far from the neighbors, owing to a mutual exchange of an attractive force. Therefore, thermal kinetics and pressure simply determines either

- 1) decreased entropy at which point the polyhedra cease vortical motion and move into a static lattice structure forming ice (water in its condensed phase), or
- 2) increased entropy and vortical velocity results in cavitation facilitating the polyhedra's escape from the surface at the boiling point.

What I have said so far is that water particles draw energy straight from vacuum space. Think of the vacuum medium as a limitless well of energy and the cohesion bound water polyhedra as the pump. The relativistic principle behind this is simple; matter tells space how to curve and space tells matter how to move. As particles of mass draw upon the zero-point energy, this energy becomes the vector determinant of the bulk commodities motion.

Think of this as quantum thermodynamics where there is freedom of uniform motion in space with constraints imposed upon the first two of our conditions referred to in paragraph 10. This aspect of thermodynamics involves heat (kinetics) only as a secondary consideration. Water, as a closed system, is subject to fluctuations between information maximization and minimization. Its structural integrity at information maximization is its least probable state (supporting minimum particle size), its highest energy state, and its most efficient hydrating state.

Recent testing under laboratory conditions of water engineered by my virtual laser, definitely substantiates my hypothesis concerning the reduction in particle size of high spin state water. A virtual laser imposes coherence (structure) on the vacuum medium around and through a given volume of water and rotates energy out of vacuum into the H₂O molecule, thus determining the geometry and

subsequent size of the water polyhedron. Thus, water is pulled into a higher coherent quantum state which no current (known) set of conditions in the natural world will spontaneously replicate.

This water is stable under all conditions except for exposure to microwave energy. Absorption tests performed on cellular membranes gave hydration results which were greater than 80% improvement in absorption rate compared to all other water samples in the study. These studies were carried out under the supervision of a PhD in microbiology in Florida. Subsequent testing on tissue samples from mammals and birds was carried out by a PhD in biochemistry in Minnesota. Similar impressive results were obtained in both independent tests. Water was observed in both tests traversing the membrane wall of the cell within time frames virtually unprecedented in such procedures. In addition to the extraordinary compression of the hydration time frame, it was reported that the volume of water going into the cells was greater than is normally observed with different samples of water purified by various means before conducting the tests.

The average particle size of the water polyhedra after engineering with the virtual laser is in the range of .4nm (4Å). A direct correlation can be determined between the hydrogen bonding angle and the particle size (in angstrom units) given the number of H₂O molecules allowable by the angle of bonding. They will assemble in units divisible by four.

My engineered water exhibits amazing properties and gives ample evidence of the benefits of using this water in all mammals species that have had their drinking water replaced with the engineered version.

Dan Nelson

November 2009

<http://waybackwater.com/dans-white-paper/>