

# The experiments of Masaru Emoto with emotional imprinting of water

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## Abstract

Masaru Emoto has carried out very interesting experiments with water at critical point for freezing. He claims that words expressing emotions have effect on the crystals formed in the process. Emoto reports that words with positive emotional contents produce beautiful crystals and those with negative emotional content generate ugly ones. Also music and even pictures are reported to have similar effect. Emoto has also experimented with rice in water and claims that the words with positive emotions content induce a metabolic process known as fermentation whereas those with negative emotional content tend to induce rotting. The experiments can be certainly criticized and people calling themselves skeptics have reacted violently to these claims. TGD inspired theory of consciousness and quantum biology suggests the presence of just this kind of effects and therefore one can make the working hypothesis that the effects are real, and see what the TGD based explanation for them could be.

In the sequel I will consider the working hypothesis that the effects are real, and develop an explanation based on TGD inspired quantum biology. The basic ingredients of the model are following: magnetic body (MB) carrying dark matter as  $h_{eff}/h = n$  phases of ordinary matter; communications between MB and biological body (BB) using dark photons able to transform to ordinary photons identifiable as bio-photons; the special properties of water explained in TGD framework by assuming dark component of water implying that criticality for freezing involves also quantum criticality, and the realization of genetic code and counterparts of the basic bio-molecules as dark proton sequences and as 3-chords consisting of light or sound providing a universal language allowing universal manner to express emotions in terms of bio-harmony realized as music of light or sound. The entanglement of water sample and the subject person (with MBs included) realized as flux tube connections would give rise to a larger conscious entity expressing emotions via language realized in terms of basic biomolecules in a universal manner by utilizing genetic code realized in terms of both dark proton sequences and music of light of light and sound.

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## 1 Introduction

Sini Kunnas sent a link to a video telling about experiments of Masaru Emoto (see <http://tinyurl.com/pqy57jj>) with water, which is at criticality with respect to freezing and then frozen. Emoto reports is that words expressing emotions are transmitted to water: positive emotions tend to generate beautiful crystal structures and negative emotions ugly ones. Also music and even pictures are claimed to have similar effects. Emoto has also carried out similar experiments with rice in water. Rice subjected to words began to ferment and water subject to words expressing negative emotions began to rotten.

**Remark:** Fermentation is a metabolic process consuming sugar in absence of oxygen. Metabolism is a basic signature of life so that at least in this aspect the water+rice system would become alive. The words expressing positive emotions or even music would serve as a signal “waking up” the system.

One could define genuine skeptic as a person who challenges existing beliefs and pseudo-skeptic (PS in the sequel) as a person challenging - usually denying - everything challenging the mainstream beliefs. The reception of the claims of Emoto is a representative example about the extremely hostile reactions of PSs as aggressive watchdogs of materialistic science towards anything that challenges their belief system. The psychology behind this attitude is same as behind religious and political fanaticism.

I must emphasize that I see myself as a thinker and regard myself as a skeptic in the old-fashioned sense of the word challenging the prevailing world view rather than phenomena challenging the prevailing world view. I do not want to be classified as believer or non-believer. The fact is that if TGD inspired theory of consciousness and quantum biology describes reality, a revolution in the world view is unavoidable. Therefore it is natural to consider the working hypothesis that the effects are real and see what the TGD based explanation for them could be.

The Wikipedia article about Masaru Emoto (see <http://tinyurl.com/pqy57jj>) provides a good summary of the experiments of Emoto and provides a lot of links so that I will give here only a brief sketch. According to the article Emoto believed that water was a “blueprint for our reality” and that emotional “energies” and “vibrations” could change the physical structure of water. The water crystallization experiments of Emoto consisted of exposing water in glasses to different words, pictures or music, and then freezing and examining the aesthetic properties of the resulting crystals with microscopic photography. Emoto made the claim that water exposed to positive speech and thoughts would result in visually “pleasing” crystals being formed when that water was frozen, and that negative intention would yield “ugly” crystal formations.

In 2008, Emoto and collaborators published an article titled “Double-Blind Test of the Effects of Distant Intention on Water Crystal Formation” about his about experiments with water in the Journal of Scientific Exploration, a peer reviewed scientific journal of the Society for Scientific Explorations (see <http://tinyurl.com/yicsnu2oc>). The work was performed by Masaru Emoto and Takashige Kizu of Emoto's own IHM General Institute, along with Dean Radin and Nancy Lund of the Institute of Noetic Sciences, which is on Stephen Barrett's Quackwatch (see <http://tinyurl.com/y99ko12e>) blacklist of questionable organizations. PSs are the modern jesuits and for jesuits the end justifies the means.

Emoto has also carried experiments with rice samples in water. There are 3 samples. First sample “hears” words with positive emotional meaning, second sample words with negative emotional meaning, and the third sample serving as a control sample. Emoto reports (see <https://youtu.be/Wc-ZmvxfBxE>) that the rice subjected to words with positive emotional content began to ferment whereas water subject to words expressing negative emotions began to rotten. The control sample also began to rotten but not so fast.

In the sequel I will consider the working hypothesis that the effects are real, and develop an explanation based on TGD inspired quantum biology [K5, K4, K3]. The basic ingredients of the model are following: magnetic body (MB) carrying dark matter as  $h_{eff}/h = n$  phases of ordinary matter; communications between MB and biological body (BB) using dark photons able to transform to ordinary photons identifiable as bio-photons; the special properties of water explained in TGD framework by assuming dark component of water implying that criticality for freezing involves also quantum criticality, and the realization of genetic code and counterparts of the basic bio-molecules as dark proton sequences and as 3-chords consisting of light or sound providing a universal language allowing universal manner to express emotions in terms of bio-harmony realized

as music of light or sound. The entanglement of water sample and the subject person (with MBs included) realized as flux tube connections would give rise to a larger conscious entity expressing emotions via language realized in terms of basic biomolecules in a universal manner by utilizing genetic code realized in terms of both dark proton sequences and music of light of light and sound.

## 2 The reception of the findings of Emoto

The findings of Emoto challenge the materialistic world view and have received both genuine criticism and “criticism”.

### 2.1 Criticism and “criticism”

Commentators have criticized Emoto for insufficient experimental controls and for not sharing enough details of his approach with the scientific community. Prof. emeritus William A. Tiller, a researcher featured in the documentary “*What The Bleep Do We Know?*”, states that experiments of Emoto fall short of proof, since they do not control for other factors in the supercooling of water. It is easy to agree that scientific proof is not in question. William Tiller claims that supercooling of water involved with the experiments might have delicate effects difficult to control.

**Remark:** Supercooling of water makes it critical system, even quantum critical and in TGD Universe, and this makes it ideal target of remote mental interactions.

A lot of experiments are needed: in particular, the possible dependence on the person who utters the words with emotional content, deserves to be studied. Just taking randomly chosen group of people and control system might not be enough to achieve a significant effect. Situation could be similar to that in the recent double slit experiments of Radin [L6] (see <http://tinyurl.com/y72b87p7>), in which subject person tries to intentionally affect the interference pattern for light travelling through slits. The effect is clear in the case of experienced meditators. That very few of us are not concert pianists, cannot be used to argue that there are no concert pianists.

There is also the authoritative “criticism”, which carefully avoids stating anything about contents of the work and directs the efforts on rhetoric tricks. These “criticisms” do not deserve serious attention except as perfect examples of the empty rhetorics so typical for PSs. The following examples are citations from the Wikipedia article (see <http://tinyurl.com/pqy57jj>).

Emoto has been criticized for designing his experiments in ways that leave them prone to manipulation or human error influencing the findings. Biochemist and Director of Microscopy at University College Cork William Reville wrote, “*It is very unlikely that there is any reality behind claims of Emoto.*”. Reville noted the lack of scientific publication and pointed out that anyone who could demonstrate such a phenomenon would become immediately famous and probably wealthy.

**Remark:**The absence of scientific publication (in respected journal of course) often reflects the fact that PSs have reached their goal to prevent publishing anything challenging their beliefs. I have experienced this myself during four decades very concretely. At nineties it became even impossible to get anything into arXiv.

Writing about Emoto’s ideas in the Skeptical Inquirer, physician Harriet A. Hall concluded that it was “*hard to see how anyone could mistake it for science*”. Commenting on Emoto’s ideas about clearing water polluted by algae, biologist Tyler Volk stated, “*What he is saying has nothing to do with science as I know it.*” Stephen Kiesling wrote in Spirituality & Health Magazine, “*Perhaps Emoto is an evangelist who values the message of his images more than the particulars of science; nevertheless, this spiritual teacher might focus his future practice less on gratitude and more on honesty.*”.

Needless to restate that these comment say nothing about contents.

### 2.2 Emoto is not the only victim of pseudo-skepticism

The criticism of the experiments of Emoto mostly reflects the prevailing materialistic dogmas, which do not allow these effects so that depending on the authority Emoto is concluded to be mad,

charlatan, or evangelist. The rage of PSs is really frightening and demonstrates how powerful effects ideology can have.

Emoto shares the fate of experimenters studying water memory and homeopathy. "Homeopathy" is indeed a word making skeptic growl and drool: one can hardly imagine a more impressive demonstration of words on water than this! An almost- Nobelist Benveniste was labelled as swindler as he announced about experiments providing support for water memory and homeopathy. Magician Randi - Randi again(!) - participated the investigation of the mind-police of science, in which Benveniste and laboratory staff was treated like criminals unless otherwise proven.

There is a lot of support about the representation of water memory as extremely low frequencies (ELF) of radiation associated with water [I2, I3]. These ELF frequencies can be stored electronically and they produce the same effects as the bio-active chemical, whose presence induced these frequencies in water. These facts PSs simply neglect because they do not fit the belief system of PSs dating back to 18th century. At the age of IT the idea about the existence of representations of bio-active molecules as frequency patterns able to induce the biological effects of molecules without the presence of molecules should not raise aggressions.

Few years ago HIV Nobelist Montagnier did experiments giving support for water memory and the procedure involved a part very similar to that used in preparing homeopathic remedies [I6] [L1]. In TGD framework these frequencies would correspond to cyclotron frequencies assignable to MBs of molecules, and immune system is proposed to have emerged from the ability of water to mimic the magnetic bodies of invader molecules and learning to recognize them [K2]. This interpretation could mean a breakthrough in biology but unfortunately the time is not mature for this yet.

Remote mental interactions/paranormal phenomena [K5] belong also to the pariah phenomena having no place in materialistic world and people having the courage to challenge this view are labelled as science criminals by PSs.

### 2.3 Analyzing the mindset of PS

People calling themselves skeptics are rarely skeptics in the original meaning of the word but believers, even fanatic believers. The basic un-challengeable belief is materialism stating that consciousness is only an epiphenomenon - illusion as David Dennett puts it without explaining what he means with the claim that consciousness does not exist but is only one particular phenomenon of consciousness - namely illusion. There is no free will and there are no genuine intentional actions. Moral and ethics are illusions. And certainly, human can have no intentional effects on water since even genuine intentional effects on our own body are impossible. This leads to the notion of objectivity as PS understands it.

This notion of objectivity implies that the outcome of given experiment cannot depend on who carries it or on who the subject persons are. If this turns out to not be the case, the experiment is not well-done and experimenter can be ridiculed. Water is dead matter for PS, even the PS himself should be dead matter if the materialistic logic is taken to its bitter end. I dare guess that most PSs privately believe - without even realizing that this is the case - that their intentions genuinely affect the sack of water with some chemicals that is called their body. It is extremely difficult pretend that one is not conscious when one is conscious.

The conclusion of the PS is that the outcome of Emoto's experiments with water and rice cannot depend at all on the person who utters the words expressing positive or negative emotions. PS calls this assumption objectivity but is actually only an assumption that there is no such thing as intentional free will and that we live in a deterministic world of billiard balls. This view is known to be wrong: quantum entanglement has been verified for cell sized system in macroscopic scales and quantum world is non-deterministic - mentioning this fact is carefully avoided in text books. PSs also unashamedly put under the rug hundreds of anomalies related to the physics of water.

If human intention and emotion can have effects on water, the first question is whether the intention and emotion of some humans these effects are stronger. Belief moves mountains and since Emoto believes that intention can have effects, it would be only natural that the effects are stronger. If this is true, one cannot demand the repeatability of the experiment anymore. In paranormal research the experimenter effect is well-known - some experimenters are more successful than others without being charlatans - as also in medicine. This is the case always when living systems are involved. There is another amusing example demonstrating the shallowness of the

thinking of PSs: PSs love to say that the effects of healing practices produce nothing but placebo effects without realizing that placebo effect as such is a fascinating mind-over-matter effect begging for explanation!

Of course, if Emoto believed that the emotions have effects on water, his desire to prove this belief might have produced these effects - not by cheating but by intentional rather than emotional imprinting based on remote mental interactions affecting water. The words as such need not have caused the effect. This would represent an example of remote mental interactions. Note however that also music and even pictures were reported to have effects on water and it is not easy to explain this as experimenter effect.

An amusing "experiment" on rice was carried out by a hard-nosed skeptic Carry Poppy (see <http://tinyurl.com/y8g9jgal>). The extremely nasty tone of the article reveals the hatred of Poppy towards Emoto and people challenging the materialist world view. The outcome of the "experiment" carried by Poppy was of course negative. Perhaps not surprising, the outcome would express faithfully the real intention and desire of the experimenter!

### 3 TGD based model for Emoto's findings

In TGD based view the notion of magnetic body (MB) is central [K4, K3]. MB carries dark phases of matter identified as phases of ordinary matter with  $h_{eff}/h = n$  making possible macroscopic quantum coherence explaining the coherence of living matter not understandable in the biochemistry based approach. The interactions between MB and biological body (BB) are essential remote mental interactions based on signalling using dark photons. Therefore the basic mechanisms of quantum biology would be also mechanisms of remote mental interactions - only the target would be non-standard. We are mostly water and it would not be surprising if these mechanisms would allow intentional and emotional imprinting of also water outside our body and in quantum critical state.

#### 3.1 Basic ingredients of the model

In TGD universe water is very special substance in that it contains both ordinary water and its dark variant. What makes it dark is that dark magnetic flux tubes representing long hydrogen bonds are present for some portion of water [L13] (see <http://tinyurl.com/y8fvwbp9>): the length of bonds scales as  $n$  or perhaps even  $n^2$ . The presence of these flux tubes makes any liquid phase a network like structure and one ends up with a model explaining an anomaly of thermodynamics of liquids at criticality known already in Maxwell's time. This leads to a model explaining the numerous anomalies of water in terms of the dark matter.

For instance, the dark part of water with non-standard Planck constant transforms to ordinary water in freezing. As a consequence, a large amount of energy is liberated. This explains why water has anomalously large latent heat of fusion. One can also understand why the volume of water increases in freezing and decreases in heating in the interval 0-4 °C. The anomalies of water are largest at physiological temperature  $T_{phys} \sim 37$  °C suggesting that the dark portion of water is largest at  $T_{phys}$ . Dark fraction of water would be essential for life.

Dark protons sequences at flux tubes representing genetic code and the analogs of basic biomolecules are realized in water. Pollack effect [L3] (see <http://tinyurl.com/oyhstc2>) requiring feed of energy - as IR radiation for instance - generates so called exclusion zones (EZs), which are negatively charged regions. A fraction of protons from water must go somewhere and the TGD inspired proposal [L3] (see <http://tinyurl.com/gwasd8o>) is that the protons transform to dark protons at magnetic flux tubes. The dark variants of particles quite generally have higher energies than ordinary ones and energy feed provides the needed metabolic energy go make the protons dark. In the case of homeopathy and water memory mechanical agitation creates provides the metabolic energy and would generate EZs accompanied by dark proton sequences at flux tubes [K2].

Remote expression of emotions as crystal patterns - emotional imprinting - is required and communication requires a code so that receiver and sender have same interpretation for the signal. Genetic code would provide the fundamental code making possible universal meanings. TGD

leads to two basic proposals predicting the numbers of DNA codons coding for given AA rather successfully.

1. The first proposal [L4] relies on TGD view about dark matter as  $h_{eff}/h = n$  phases of ordinary matter [K1, K7, K8] motivated by adelic physics extending physics to include also the correlates of cognition [L7, L8] (see <http://tinyurl.com/ycbhse5c> and <http://tinyurl.com/ybzkfevz>). The empirical motivation comes from several sources, in particular from the findings of Pollack.

Dark genetic code would be realized in terms of dark proton sequences at flux tubes- dark nuclei. The model predicts dark counterparts of DNA, mRNA, tRNA, and AA as dark proton sequences which codons identifiable as dark proton triplets. Bio-chemistry would emerge as a shadow of the much simpler dynamics of dark matter at flux tubes and genetic code would be induced by dark code code.

2. Second model of genetic code emerged accidentally from a geometric model of music harmony [L2, L12] (see <http://tinyurl.com/yad4tqw1> and <http://tinyurl.com/yd8d8x6j>) involving icosahedral (12 vertices-12-note scale and 20 faces-number of AAs) and tetrahedral geometries leading to the proposal that DNA codons and possibly also AAs correspond to 3-chords defining the harmony and obtained as unions of 20+20+20 3-chords associated with icosahedral 20-chord harmonies with symmetries  $Z_6, Z_4, Z_2$  plus tetrahedral 4-chord harmony. There is large number of these harmonies bringing in additional degrees of freedom.

**Remark:** This model has obviously analogies with the notion of wave genome introduced by Peter Gariaev [I4, I5, I9].

Since music both expresses and creates emotions, the proposal is that these harmonies assigning additional hidden degrees of freedom to the MBs of dark variants of DNA, RNA, etc... serve as correlates of emotions also at the molecular level. This emotional context could also give rise to context dependence of the code if several harmonies are realizable chemically. Taking seriously TGD inspired theory of consciousness [L9] (see <http://tinyurl.com/ycxm2tpd>) and model of emotions [L11] (see <http://tinyurl.com/ydhxen4g>), one might say that the details of the code might depend slightly on the “emotional” state of DNA, RNA, and possibly other molecules.

### 3.2 TGD based mechanism for emotional imprinting

One must not forget that as a passionate researcher Emoto probably had very intimate relationship with water! As we all have with one particular water volume, which we call our body! I can intend raising my hand and it raises. Also my emotions are expressed in this personal bag of water containing also some fraction of biomolecules. I doubt that even the most fanatic PS would not try to tell me that I am performing a sleight of hand as I do this. But they should do this in order to take their materialistic logic to its bitter end.

One can perhaps say that Emoto extended his body by fusing with the MB of water, which in turn controls the ordinary part of water just like it controls our own body. The reports of experiences about extension of body are not unheard in the spiritual practices. Not even in everyday life. If you touch ground with a stick, you experience the touch as if the stick were part of your body. Could the stick really become part of your body in some sense?

What could be the precise mechanism for emotional imprinting (as analog of intentional imprinting that Tiller talks about [J2])?

1. The basic vision is that living matter is a quantum critical system making it extremely sensitive to perturbations (actually TGD Universe is quantum critical in well-defined sense [L14] (see <http://tinyurl.com/yakz111k>). This makes biological system an ideal sensor and motor instrument. In particular, intentions can affect body water at quantum criticality optimally. At quantum criticality phases with several values of Planck constant  $h_{eff}/h = n$  are present and correspond to dark matter which is the key player in TGD inspired model of living systems. As already noticed, the dark portion of water would be maximal at physiological temperature.

2. In the system studied by Emoto the subject person and water must form an entangled quantum critical system. Water - or rather, the MB of water - must have part of it in  $h_{eff}/h = n$  dark phase becoming in certain sense part of subject person. Magnetic flux tubes connecting subject person to a sample of water (or of rice and water) and carrying dark matter would serve as correlates of attention.

What might be called loving attention would provide metabolic energy to the target and might be essential element in generating the dark phase giving rise to the beautiful crystal patterns.  $h_{eff}/h = n$  can be seen as kind of universal IQ: the more the system contains subsystems with large  $n$ , the higher its ability to generate conscious information, negentropy, is.

Therefore choosing randomly a subject person who just says a word with positive or negative meaning but without emotion might not be enough to reproduce Emotos findings. It is also quite possible that the outcome of the experiment is a realization of subject person's intention/desire to have the desired effect. This would not however reduce the profound implications of the findings of Emoto if they are true.

3. Thanks to the presence of dark portion of water, super-cooled water is quantum critical system in TGD Universe. In supercooling the temperature can become considerably lower than in the usual freezing and means that also the dark portion of water stays dark. This dark portion would react to the intentions of subject person. The crystal structures would serve as kind of photograph is of the representations of mental images of the system subject person + dark portion of water.

**Remark:** Water normally freezes at 273.15 K (0 °C), but it can be supercooled at standard pressure down to its crystal homogeneous nucleation at almost 224.8 K.

What about the effects of music and even visual pictures on water? Also these effects are in principle possible and would rely on universal representation of emotions in living matter at molecular and maybe even at higher levels. Since music represents and creates emotions, the natural assumption is that the collection of allowed 3-chords express emotions both at the molecular level and at the level of MB.

1. The resonant interaction by 3-chords made of photons is possible between any pair formed by taking given member to be either DNA, RNA, tRNA or its dark variant. Dark counterparts of AAs would couple resonantly to the frequencies defined as sums of the frequencies of 3-chords. These dark variants of bio-molecules are present also in water if TGD based explanation of Pollack effect is correct. One actually ends up to a model for prebiotic evolution involving dark nuclei made from dark proton sequences in an essential manner [L10, L12](see <http://tinyurl.com/yalny39x> and <http://tinyurl.com/yd5t82gq>).
2. The frequencies of visible light are rather high for the ordinary value of Planck constant. The original motivation for the hierarchy of Planck constants was the finding that ELF em fields have quantal effects on living matter [J1]. This led to a proposal in which bio-photons at visible and UV frequencies are dark photons at ELF frequencies transformed to ordinary photons [K6]. Also the reverse transformation taking ordinary photons to dark photons is possible so that dark matter - dark variants of AAs responding resonantly to single frequency - at the flux tubes can "see".
3. The effect of words expressing positive emotions would initiate metabolism based on fermentation. The spoken words must serve as encouraging of dis-encouraging control signal just as music of light. The meaning of the words should be same for the subject person and the system rice + water. This can be the case if the systems entangle to single system via flux tube bridges.

This relates interestingly to the theory of Russian biologist Peter Gariaev based on the assumption that genes define a language in rather concrete sense [I10, I8, I7]. I have developed these ideas from TGD point of view in [L12] (see <http://tinyurl.com/yd5t82gq>): dark variants of genes identified as dark proton sequences - essentially dark variants of nuclei - define a universal language.

4. In the model the 3-chords in question are made of light. In the case of music as we understand it they would be made of sound. In living matter sounds can be transformed to em oscillations by piezo-electric effect. The resulting em oscillations would be accompanied by both ordinary and dark photons, and both the 3-chords and melody of the music would couple to dark dark proton triplets at flux tubes serving as counterparts of DNA, RNA, tRNA, and AAs. If the same mechanism is involved with Emoto's experiments, the sounds should transform to light or they should induce at flux tubes vibrations - dark phonons - at the same frequencies that realize the representation of biomolecules and their dark variants as 3-chords.

**Remark:** In TGD Universe physical state as a collection of particles is replaced with a network of flux tubes having particles at its nodes [L5] (see <http://tinyurl.com/y9kwnqfa>). Therefore sound as vibrations of the length of flux tube accompanied by fermionic string connecting pair of nodes becomes fundamental excitation rather than something emerging only at condensed matter physics.

Ugly crystals are assigned with negative emotions and emotions are assigned with harmonies. Harmonies - also those, which are sad (consider only passions of Bach) - are however usually thought of as something beautiful. Can negative emotions really correspond to any bio-harmonies characterized by symmetries. In a discussion with Sini Kunnas I realized that also the notion of disharmony could make sense. There are indeed 6 Hamiltonian cycles without any symmetries [A2, A3, A1]. I neglected them in the model of harmony because they would represent which one might call disharmony. Could one of the contributing 3 Hamiltonian cycles in bio-harmony correspond to this kind of dis-harmony and bring in 20 3-chords without any symmetries? If so the relationship between geometry and aesthetics would become very concrete. The alternative view would be that there are several harmonies realized simultaneously and thi creates disharmony.

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