

Evidence of Non-Local Physical, Chemical and Biological Effects Supports Quantum Brain

Huping Hu and Maoxin Wu

Abstract

Previously we carried out experiments from the perspective of our spin-mediated consciousness theory to test the possibility of quantum-entangling the quantum entities inside the brain with those of an external chemical substance. We found that applying magnetic pulses to the brain when an anesthetic was placed in between caused the brain to feel the effect of said anesthetic as if the test subject had actually inhaled the same. We further found that drinking water exposed to magnetic pulses, laser light or microwave when an anesthetic was placed in between also causes brain effects in various degrees. Through additional experiments, we verified that the said brain effect was indeed the consequence of quantum entanglement. These results defy common belief that quantum entanglement alone cannot be used to transmit information and support the possibility of a quantum brain. While our reported results are under independent verifications by other groups, we report here our experimental findings of non-local chemical, thermal and gravitational effects in simple physical systems such as reservoirs of water quantum-entangled with water being manipulated in a remote reservoir. With the aids of high-precision instruments, we have found that the pH value, temperature and gravity of a liquid such as water in the detecting reservoirs can be non-locally affected through manipulating water in the remote reservoir. In particular, the pH value changes in the same direction as that being manipulated; the temperature can change against that of local environment; and the gravity can change against local gravity. These non-local effects are all reproducible, surprisingly robust and support a quantum brain theory such as our spin mediated consciousness theory. They can be used for non-local signaling and many other purposes. We suggest that they are mediated by quantum entanglement between nuclear and/or electron spins in the treated liquids and discuss the profound implications of these results.

Key Words: quantum entanglement, non-local effect, gravity, pH, temperature, quantum brain, spin-mediated consciousness.

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1.Introduction

Many if not most scientists do not believe that quantum effects or quantum information plays any role in consciousness (see, e.g., Tegmark, 2000). Thus, to gain credibility and make real progress any serious attempt at a quantum brain theory should start with a theoretically plausible hypothesis and then move to experimental work instead of endless armchair debates and speculations, that is, we suggest that "one puts his money where his mouth is." Further, scientific methods dictate that a hypothesis should only achieve legitimacy if it is experimentally verified. Thus, since the summer of 2004 to the present, we have mainly focused our efforts on the experimental verifications of our spin-mediated consciousness theory (Hu & Wu, 2002, 2004, 2006b&c).

Scientific methods also require that one conform one's knowledge of nature to repeatable observations. Thus, it is unscientific to reject what's observed repeatedly and consistently. With this in mind, we comment that quantum entanglement has been recently shown to be physically real in many laboratories (Julsgaard, *et al*, 2001; Ghosh, 2003). Indeed, spins of electrons, photons and nuclei have now been successfully entangled in various ways for the purposes of quantum computation and communication (Matsukevich & Kuzmich, 2004; Chanelière, *T et al*, 2005). On the other hand, we have recently observed non-local effects of chemical substances on the brain produced through quantum entanglement (Hu & Wu, 2006a,b&c) which are commonly thought to be impossible (Eberhard, 1978).

Here we report our work carried out on simple physical systems, in particular, water, using simple physical/chemical observables such as pH, temperature and gravity measured with high-precision instruments. Our motivation for measuring pH change of water in one reservoir, while manipulating water in a remote reservoir quantum-entangled with the former, is to investigate whether and how pH value in the water being measured shifts under non-local

influences. Our motivation for measuring temperature variation of water in one reservoir, while manipulating water in a remote reservoir quantum-entangled with the former, is to investigate whether and how the thermodynamics of water being measured changes under non-local influences. Our motivation for measuring gravity change of one reservoir of water, while manipulating water in a remote reservoir quantum-entangled with the former, is to investigate whether gravity is a non-local effect associated with quantum entanglement. However, our main goal has been to investigate whether there are any robust macroscopic quantum effects which support a quantum brain theory.

The successes of the experiments described herein were achieved with the aids of high-precision analytical instruments. They include an Ohaus Voyager Analytical Balance with capacity 210g, resolution 0.1mg, repeatability 0.1mg and sensitivity drift 3 PPM/°C, a Control Company traceable-calibration digital thermometer with resolution 0.001°C and repeatability 0.002°C near 25°C in liquid such as water (estimated from calibration data provided), and a Hanna microprocessor pH meter Model 213 with resolution 0.001 and repeatability 0.002. The other key apparatus is a 25-litre Dewar filled with liquid nitrogen and positioned remotely at a desired distance which not only provided the drastic changes in the water being manipulated but also served as a natural Faraday cage blocking any possible electromagnetic influence between the water being measured and the water being manipulated. Also vital to the success of the experiments described herein was the stable environment found in an underground room which shields many external noises such as mechanical vibration, air turbulence and large temperature change.

2.Materials & Methods

Quantum-entangled stock water in individual volumes of 500ml or similar quantities was prepared as described previously (Hu & Wu, 2006b&c) which might then be split into smaller volumes

or combined into larger ones based on needs. Briefly, in one procedure 500ml fresh tap water in a closed plastic reservoir was exposed to microwave radiation in a 1500W microwave oven for 2min and then left in room temperature for 24 hours before use. In a second procedure 500ml fresh tap water in the closed plastic reservoir was exposed to audio-frequency radiations of a 20W magnetic coil for 30min and then left in room temperature for 24 hours before use. In a third procedure, 500ml bottled natural water was simply left in room temperature for at least 30 days before use. In a fourth procedure, 500ml bottled distilled water was simply left in room temperature for at least 30 days before use. It was found previously that the stock water prepared according to these procedures is quantum-entangled (*id.*).

Figure 1 shows a diagram of the key experimental setup. Figure 1A is a photograph of the actual key experimental setup except that the 25-litre Dewar was not located near the measurements as shown but at a remote location described below. It includes (1) the analytical balance calibrated internally and stabilized in the underground room for more than one week before use and a tightly closed plastic first-reservoir containing 175ml water split from the 500ml stock water which is placed on the wind-shielded pan of the balance with 1-inch white foam in between as insulation; (2) the digital thermometer and calibrated pH meter placed into the middle of a glass second-reservoir containing 75ml water split from the 500ml stock water which is closed to prevent air exchange; and (3) the 25-litre Dewar containing 15-25 litres of liquid nitrogen which is located at a distant of 50 feet from the underground room and a tightly closed plastic third-reservoir containing 250ml water split from the 500ml stock water to be submerged into the liquid nitrogen in the Dewar at a specified time.

Experiments with the above first-setup were carried out as follows: (1) prepare the 500ml quantum-entangled stock water, divide the same into 175ml, 75ml and 250ml portions and put them into their respective reservoirs described

above; (2) set up the experiment according to Figure 1 and let the instruments to stabilize for 30min before any measurements is taken; (3) record for 20min minute-by-minute changes of pH value and temperature of the water in the first-reservoir and weight of the second-reservoir with water before submerging the third reservoir into liquid nitrogen; (4) submerge the third-reservoir with water into liquid nitrogen for 15min or another desired length of time and record the instrument readings as before; and (5) take the third-reservoir out of liquid nitrogen, thaw the same in warm water for 30min or longer and, at the same time, record the instrument readings as before. Control experiments were carried out in same steps with nothing done to the water in the third-reservoir.

In one variation of the above setup, the closed plastic third-reservoir was replaced with a metal container and instead of freeze-thaw treatment the water in the metal container was quickly heated to boiling within 4-5 minutes and then cooled in cold water. In a second variation of the above setup, the gravity portion of the experiment was eliminated and the water in the first and second reservoirs was combined into a closed thermal flask which prevents heat exchange between the water being measured and its local environment. In a third variation of the above setup, the gravity portion of the experiment was eliminated and the water in the first and second reservoirs was combined into a fourth plastic container in which 5ml concentrated HCl (38% by weight) was first added, then 20g NaOH powder was added and next the same water was transferred to a metal container and heated to boiling on a stove. In a fourth variation of the above first-setup, the 25-litre Dewar containing liquid nitrogen was replaced by a large water tank located 20-feet above the underground room which contained 200-gallon tap water sitting in room temperature for months and, instead of submersion, the water in the third-reservoir was poured into the large water tank the purpose of which was to quantum-entangle the poured water with the water in the large tank. In a fifth

variation of the above setup, the gravity portion of the experiment was eliminated and the water in the first and second reservoirs was combined into a closed glass fourth-reservoir which was moved to a location more than 50 miles away from the Dewar for temperature measurement.

Figure 2 shows a diagram of the second experimental setup. Figure 2A is a photograph of the actual second experimental setup. It includes: (1) a red laser with a $50mW$ output and wavelengths $635nm - 675nm$ placed next and pointed to a flat glass first-reservoir containing $200ml$ tap water sitting in room temperature for more than a week without air exchange; (2) the calibrated pH meter and optionally the digital thermometer placed into the middle of the said flat glass reservoir which was closed to prevent air exchange; and (3) a round glass second-reservoir containing $100ml$ concentrated HCl (38% by weight) to be placed $500cm$ away from the first-reservoir at a specified time.

Experiments with the above second setup were carried out as follows: (1) prepare the $200ml$ tap water and set up the experiment according Figure 2; turn on the laser so that the laser light first passes through the first-reservoir and then gets scattered on a nearby concrete wall, and let the instruments to stabilize for $30min$ before any measurement is taken; (2) record for $10min$. minute-by-minute changes of pH value and optionally temperature of the water in the first-reservoir; and (3) place the second reservoir containing $100ml$ HCl on the path of the laser light and at a distance of $500cm$ from the first reservoir and record for $60min$ or longer instrument readings as before. Control experiments were carried out in same steps in the absence of HCl.

3.Results

Figures 3, 4 and 5 summarize the results obtained from experiments conducted with the key setup and one batch of quantum-entangled water which were simply bottled natural water with a shelf time of more than 90 days. Similar results were also obtained with water prepared according to other quantum entanglement

methods mentioned above and other quantum-entangled liquid such as olive oil, alcohol and even Coca Cola as discussed later. The different distances of the Dewar from the underground room where most measurements were done made no noticeable differences with respect to the results obtained.

Figure 3 shows changes of pH value of the water in the second-reservoir during the three stages of manipulations of the water in the remote third-reservoir. As shown, within minutes after the remote third-reservoir was submerged into liquid nitrogen, during which the temperature of water being manipulated would drop from about $25^{\circ}C$ to $-193^{\circ}C$, the pH value of the water in the second reservoir steadily stopped dropping and then started rising, but about $20min$ after the frozen water was taken out of liquid nitrogen and thawed in warm water the pH value of the same steadily leveled off and started dropping again. In contrast, the control experiments did not show such dynamics. It is known that the pH value of water increases as its temperature goes down to $0^{\circ}C$. Therefore, the pH value of water being measured goes in the same direction as the remote water when the latter is manipulated. The difference in pH values from control in which no freeze-thaw was done at the point of thawing is about 0.010. However, if the water being measured is kept in a thermal flask to prevent heat exchange with the local environment, no effect on pH value was observed under freeze-thaw treatment of the remote water. Statistical analysis performed on data collected after freezing for $10min$ show that the results are significantly different under these different treatments/settings.

Figure 4 shows temperature variations of the water in the second-reservoir during the three stages of manipulations of the water in the remote third-reservoir. As shown, before the submersion of the remote third-reservoir into liquid nitrogen the temperature of the water in the second-reservoir rose in small increments due to, by design, the slight temperature difference between the local environment

and the water inside the second reservoir; but within about 4-5 minutes after the remote third-reservoir was submerged into liquid nitrogen, during which the temperature of water being manipulated would drop from about 25°C to -193 °C, the temperature of the water in the second reservoir first stopped rising and then steadily dropped in small increments; and then within about 4-5 minutes after the frozen water was taken out of liquid nitrogen and thawed in warm water the temperature of the same first stopped dropping and then steadily rose again in small increments. In contrast, the control experiments did not show such dynamics. The temperature difference from control in which no freeze-thaw was done at the point of thawing is about 0.05°C. However, if the water being measured is kept in a thermal flask to prevent heat exchange with the local environment, no dropping of temperature were observed under freeze-thaw treatment of the remote water. Statistical analysis performed on data collected after freezing for 10min show that the results are significantly different under these different treatments/settings.

In addition, Figure 4A shows one particular example of temperature variations under remote manipulation of water quantum-entangled with water being measured. In this case, the temperature difference from control at the point of thawing is about 0.08°C. Further, Figure 4B shows one example of temperature variation of a different liquid, Coca Cola, under remote manipulation of a portion of the said liquid quantum-entangled with another portion being measured. Other liquids such as distilled water, olive oil and alcohol also showed similar qualitative results under the same freeze-thaw treatment. Furthermore, preliminary experiments conducted with the temperature measurement done at a location more than 50 miles way from the Dewar also show results similar to those obtained at distances of 50 and 500 feet respectively.

Figure 5 shows weight variations of the first-reservation during the three stages of manipulation of the water in the remote third-reservoir. Before the

submersion of the remote third-reservoir into liquid nitrogen the weight being measured drifted lower very slowly. But almost immediately after the remote third-reservoir was submerged into liquid nitrogen, during which the temperature and physical properties of water being manipulated drastically changed, the weight of the first-reservoir dropped at an increased rate, and after the frozen water was taken out the liquid nitrogen and thawed in warm water the weight of the same first stopped dropping and, in some cases, even rose before resuming drifting lower as further discussed below. In contrast, the control experiments did not show such dynamics. The weight difference from control in which no freeze-thaw was done at the point of thawing is about 2.5mg. Statistical analysis performed on data collected after freezing for 10min show that the results are significantly different under these different treatments/settings.

As shown in Figure 5A, in some cases, the weight of the water being measured not only stopped dropping for several minutes but also rose. The signatures of freezing induced weight decreases and thawing induced weight increases for three different thawing times are very clear. In addition, Figure 5B shows one example of weight and temperature variations under the same remote manipulation of water quantum-entangled with water being weighed and measured respectively. Again, the signatures of freezing and thawing induced weight and temperature decreases and increases are respectively very clear. Further, Figure 5C shows another example of weight and temperature variations under another same remote manipulation in which the Dewar was located about 500 feet away from where the measurements were taken. The general background trend of decreasing temperature was due to environmental temperature change. Yet again, the signatures of freezing and thawing induced weight and temperature variations were respectively are very clear. Also, when the remote water was quickly heated to boiling on a stove instead of being frozen in liquid nitrogen, a

brief rise of weight in the range of about 0.5mg were repeatedly observed in several experiments conducted so far.

Furthermore, when the remote water was poured into the 200-gallon water tank instead of being frozen in liquid nitrogen, small but noticeably increased weight losses were repeatedly observed in the several experiments conducted to date. More specifically, before mixing of the water in the remote third-reservoir with water in the water tank the measured weight drifted lower very slowly, but within short time measured in minutes after the water in the remote third-reservoir was poured into the water tank, during which the water in the said tank got quantum-entangled with the water in the third-reservoir, the weight of the first-reservoir dropped at small but increased rate for a period of time. In contrast, the control experiments did not show such dynamics.

Figure 6 shows an example of temperature variations under the respective treatments of adding 5ml concentrated HCl (38% by weight) to the third reservoir, then adding 20g NaOH to the same and third heating the same to boiling point. The signatures of these remote treatments induced temperature changes were clear and repeatedly observable in quite a few experiments conducted to date.

Figure 7 shows the variations of pH value of the water in the first reservoir in experiments done with the setup in Figure 2. As shown, in about 30min after the second-reservoir containing 100ml concentrated HCl (38% by weight) was placed behind the first-reservoir at a distance of 500cm and on the path of the laser beam, during which the water in the first-reservoir got quantum-entangled with the content in the second reservoir, the pH value of the water in the first-reservoir steadily decreased. In contrast, the control experiments did not show such dynamics. Also, the 50mW red laser did not affect the temperature of the water in the first reservoir significantly during the whole treatment. The difference in pH value from control in which HCl was absence is about 0.070 after 50min of exposure to HCl. Statistical analysis performed on data

collected after exposure to HCl for 30min show that the results are significantly different from control. Various experiments done with direct additions of HCl to the remote water also repeated showed decreases in pH value in the water being measured.

4. Discussion

With all experimental setups and their variations described herein, we have observed clear and reproducible non-local effects with the aids of high-precision analytical instruments and under well-controlled conditions. The physical observables used for measuring the non-local effects are simple ones which can be measured with high precisions. These effects are, even under the most stringent statistical analysis, significantly above and beyond what were noticeable in the control experiments.

Through careful analysis, we have excluded the possibility that the observed weight variation was a secondary local effect due to heat loss and/or sensitivity drift of balance associated with temperature change induced by the remote manipulation. First, during the period of remote manipulation the total temperature change was less than 0.08°C so the total heat loss for the 175ml water in the first-reservoir is about 60J. In contrast, the weight loss during remote manipulation was on average about 2.5mg which is 22.5×10^9 J in energy unit. Second, the first-reservoir and the pan of the balance were separated by 1-inch white foam to prevent heat transfer to the analytic balance. Even in the highly unlikely scenario that this temperature change somehow affected the overall temperature of the balance, the associated sensitivity drift of the balance was about 0.03mg which is 10 times smaller than what's actually observed. In addition, Figures 5A, 5B and 5C also show several other signatures of remote freeze-thaw treatment as the sole cause of the observed weight variations. Therefore, the observed gravity variation is a genuine and direct non-local effect associated with quantum entanglement. However, as with many other important new results, replications by others are the key to

independently confirm our results reported here.

We chose to use liquid nitrogen in a large Dewar placed at a distant location for manipulating water in our experiments because it can provide drastic changes in temperature and properties of water in a very short period of time. Our expectation was that, if the quantum entities inside the water being measured are able to sense the changes experienced by the quantum entities in the water being manipulated through quantum entanglement and further utilize the information associated with the said changes, the chemical, thermal and gravitational properties of the water might be affected through quantum entanglement mediated non-local processes (Hu & Wu, 2006a, b & c). The most logical explanation for these observed non-local effects is that they are the consequences of non-local processes mediated by quantum entanglement between quantum entities in the water being measured and the remote water being manipulated as more specifically illustrated below.

First, when pH value of the water in the manipulation reservoir is high or low or is changing under direct manipulation such as extreme cooling or heating or addition of acidic or alkaline chemical, the measured pH in the detecting reservoir shifts in the same direction under the non-local influence of the water in the manipulation reservoir mediated through quantum entanglement and, under the condition that the detecting reserve is able to exchange energy with its local environment, as if H^+ in the latter is directly available to water in the detecting reservoir.

Second, when the temperature in the manipulation reservoir is extremely low or high or is changing under direct manipulation such as extreme cooling or heating or addition of heat-generating and/or property-changing chemical such as concentrated HCl or NaOH powder, the temperature in the detecting reservoir changes in the same direction under non-local influence of the water in the manipulation reservoir mediated through quantum entanglement and, under the

condition that the detecting reserve is able to exchange heat with its local environment so that the local thermodynamic energy is conserved, as if the heat or lack of it in manipulation reservoir is directly available to the water in the detecting reservoir.

Third, when water in manipulation reservoir is manipulated through extreme cooling, heating or mixing with large quantum-entangled mass, *e.g.*, water, such that the quantum entanglement of the water under manipulation with its local environment changes, the weight of the water in the detecting reservoir also changes under the non-local influence of the manipulation reservoir mediated through quantum entanglement so that, it is hereby predicted, that the gravitational energy/potential is globally conserved.

We suggest here that the said quantum entities inside water are likely nuclear spins for the reasons discussed below. Water contains vast numbers of nuclear spins carried by 1H . These spins form complex intra- and inter-molecular networks through various intra-molecular J- and dipolar couplings and both short- and long-range intermolecular dipolar couplings. Further, nuclear spins have relatively long relaxation times after excitations (see, *e.g.*, Gershenfeld & Chuang, 1997). Thus, when a nematic liquid crystal is irradiated with multi-frequency pulse magnetic fields, its 1H spins can form long-lived intra-molecular quantum coherence with entanglement for information storage (Khitrin & Ermakov, 2002). Long-lived (~.05 ms) entanglement of two macroscopic electron spin ensembles in room temperature has also been achieved (Julsgaard, et al, 2001). Furthermore, spin is a fundamental quantum process and was shown to be responsible for the quantum effects in both Hestenes (see, *e.g.*, Hestenes, 1983) and Bohmian quantum mechanics (Salesi & Recami, 1998). Thus, we suggest that quantum-entangled nuclear spins and/or electron spins are likely the mediators of all observed non-local effects reported here (Hu & Wu, 2006b&c).

5. Conclusion

What we have done are the following: (1) We have found that the pH value of water in a detecting reservoir quantum-entangled with water in a remote reservoir changes in the same direction as that in the remote water when the latter is manipulated under the condition that the water in the detecting reservoir is able to exchange energy with its local environment; (2) We have also found that the temperature of water in a detecting reservoir quantum-entangled with water in a remote reservoir can change against the temperature of its local environment when the latter is manipulated under the condition that the water in the detecting reservoir is able to exchange energy with its local environment; (3) We have further found that the gravity of water in a detecting reservoir quantum-entangled with water in a remote reservoir can change against the gravity of its local environment when the latter was remotely manipulated such that, it is hereby predicted, the gravitational energy/potential is globally conserved; and (4) Thus, among other things we have realized non-local signaling using three different physical observables - pH value, temperature and gravity. However, as with many other experimental findings, independent replications are the key to verify our results. Therefore, we urge all interested scientists and the like to do their own experiments to verify and extend our findings.

Perhaps the most shocking is our experimental demonstration of Newton's instantaneous gravity and Mach's instantaneous connection conjecture and the relationship between gravity and quantum entanglement. Our findings also imply that the properties of all matters can be affected non-locally through quantum entanglement mediated processes. Second, the second law of thermodynamics may not hold when two quantum-entangled systems together with their respective local environments are considered as two isolated systems and one of them is manipulated. Third, gravity has a non-local aspect associated with quantum entanglement thus can be

non-locally manipulated through quantum entanglement mediated processes. On a more fundamental level, our findings shed new lights on the nature and characteristics of quantum entanglement and gravity, reveal the true conflict between quantum theory and Einstein's theories of relativity, provide vital clues for resolution of the measurement problem in quantum mechanics, and support non-local hidden variable based theories such as Bohmian mechanics and a non-local cosmology.

With respect to applications, our findings enable various quantum entanglement assisted technologies be developed. Some of these technologies can be used to manipulate and/or affect remotely various physical, chemical and/or biological systems including human bodies. Other such technologies can be used for non-local signaling and communications between remote locations of arbitrary distances in various ways. Potentially, some of these technologies may also be used to engineer the gravitational properties of physical matters and develop new types of space vehicles.

Finally, our experimental findings show that macroscopic quantum effects such as quantum non-locality are robust in liquids such as water and maybe even in gases and solids at room temperature, thus support the proposition that quantum effects play important roles in biological systems including the functions of brain and consciousness. Our results also suggest that in quantum-entangled systems such as biological systems, quantum information may drive such systems to more ordered states against the disorderly effect of environmental heat.

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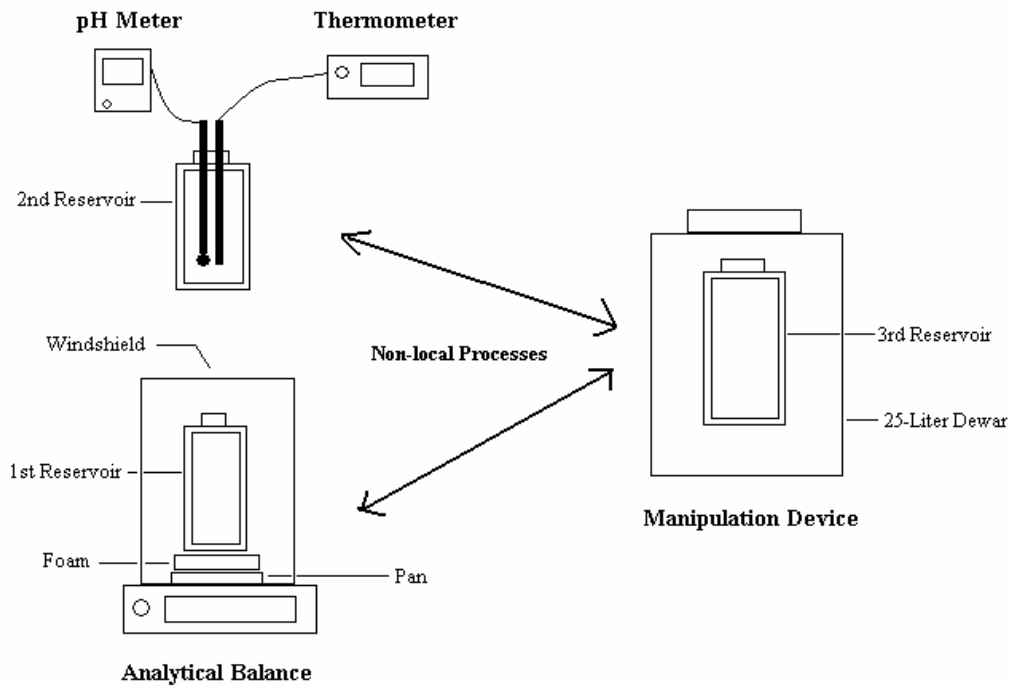


Figure1. Illustration of the key experimental setup. Several variations of this setup were also used in the actual experiments as described in the text. For example, in one variation, the manipulation was heating the water in the 3rd reservoir to boiling point and then cooling it down. In a second variation, the gravity measurement was eliminated and the manipulations were first adding 5ml concentrated HCl (30%) to the third reservoir, then adding 20g NaOH to the same and third heating the same to boiling point. In a third variation, the Dewar was located more than 500 feet away from the site of measurement. In fourth variation, the gravity and pH measurements were eliminated and the temperature measurements were carried out more than 50 miles away from the location of the Dewar.



Figure 1A. Photograph of the actual key experimental setup except that the 25-liter Dewar was not located near the measurements as shown but at a remote location described in the text.

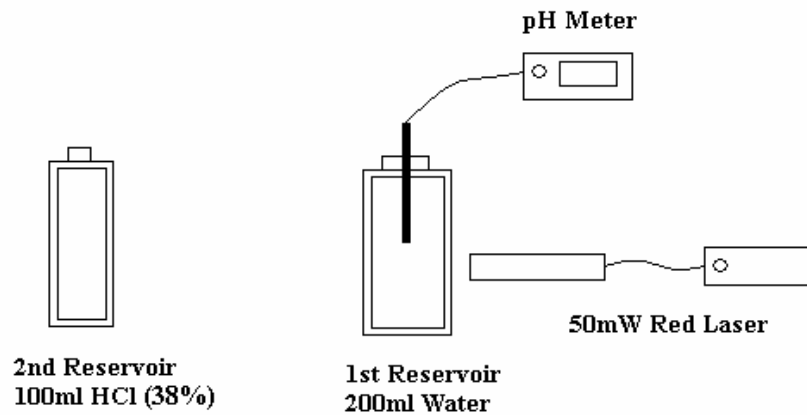


Figure 2. Illustration of the second experimental setup which allows the measurement of pH value in the presence or absence of concentrated HCl about 500cm away from and behind the water being measured. If no quantum entanglement is involved, the presence or absence of the HCl should not affect the pH value.

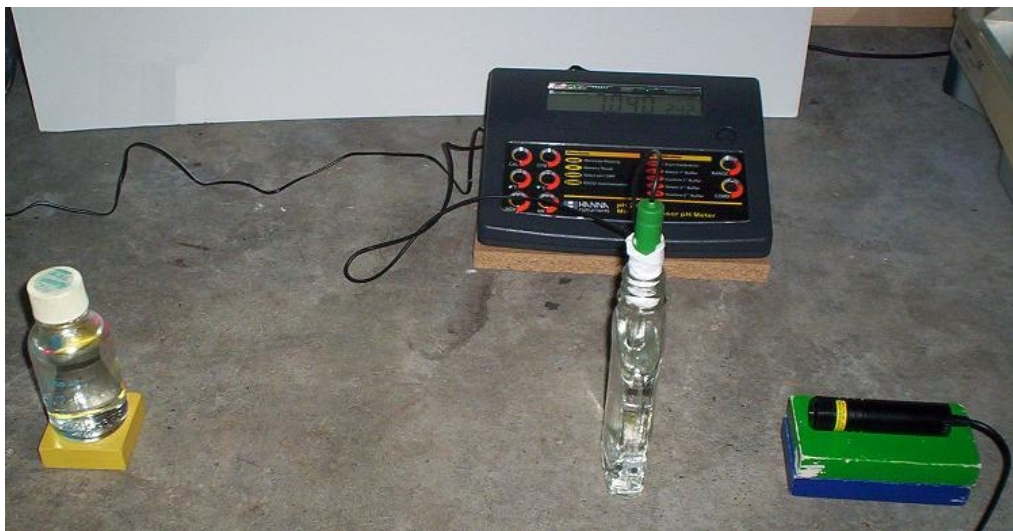


Figure 2A. Photograph of the actual second experimental setup.

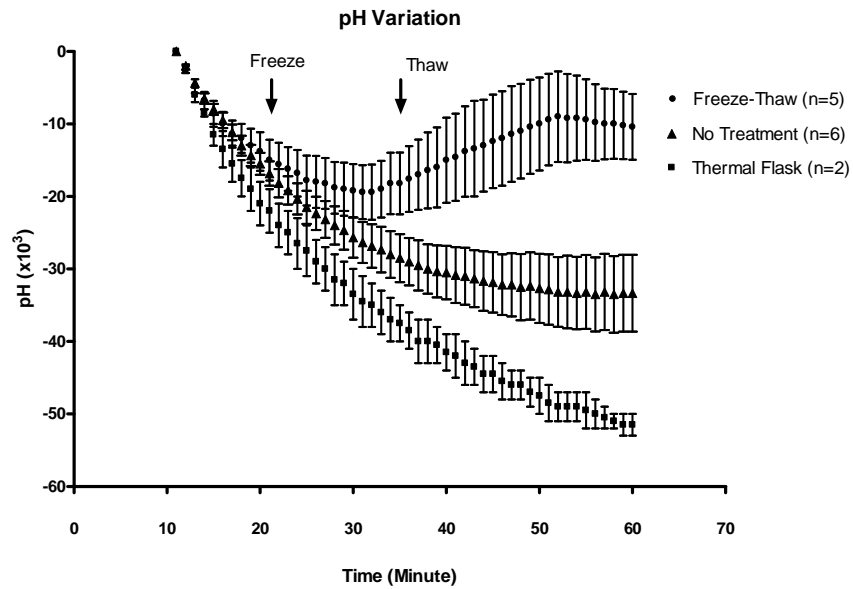


Figure 3. pH variations under remote manipulations of water quantum-entangled with water being measured. The pH value at the starting point is set to zero and the results shown were obtained from one batch of quantum-entangled water. The difference in pH values from control in which no freeze-thaw was done at the point of thawing is about 0.010. However, if the water being measured was kept in a thermal flask to prevent energy exchange with the local environment, no effect on pH value was observed during freeze-thaw treatment of remote water. Statistical analysis on data collected after freezing for 10min show that the results are significantly different under the different treatments/settings shown.

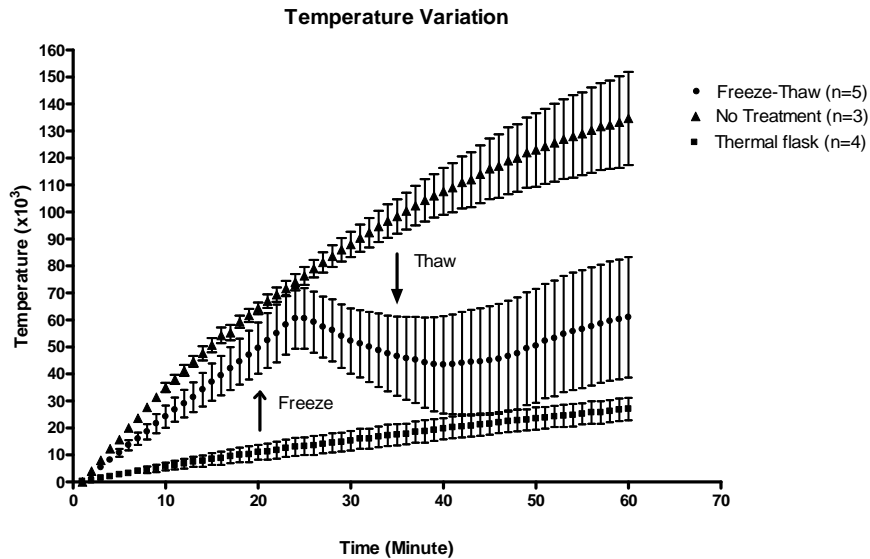


Figure 4. Temperature variations under remote manipulations of water quantum-entangled with water being measured. The temperature at the starting point is set to zero and the results shown were obtained from one batch of quantum-entangled water. The temperature difference from control in which no freeze-thaw was done at the point of thawing is about 0.05°C. However, if the water being measured is kept in a thermal flask to prevent heat exchange with the local environment, no dropping of temperature were observed under freeze-thaw treatment. Statistical analysis performed on data collected after freezing for 10min show that the results are significantly different under the different treatments/settings shown.

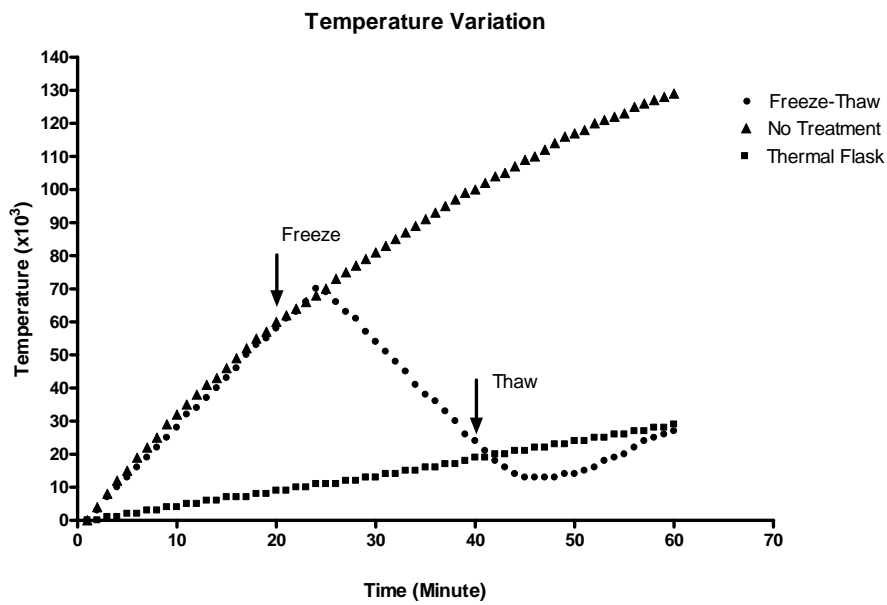


Figure 4A. One particular example detailing temperature variations under remote manipulation. The temperature difference from control at the point of thawing is about 0.08°C. However, if the water being measured is kept in a thermal flask, no dropping of temperature were observed under freeze-thaw treatment.

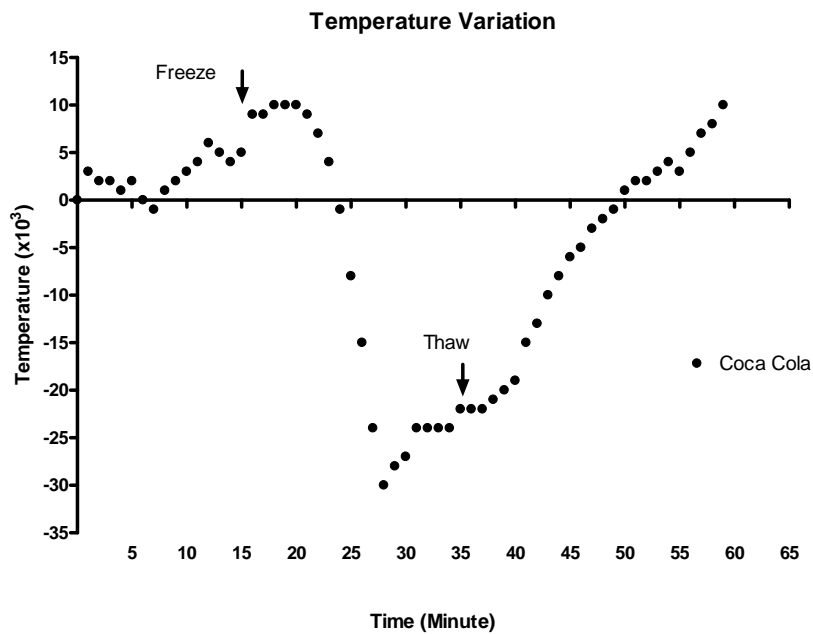


Figure 4B. One example showing temperature variation of a different liquid, Coca Cola, under remote manipulation of a portion of the said liquid quantum-entangled with another portion of the liquid being measured. Other liquids such as distilled water, olive oil and alcohol also showed similar qualitative results under the same treatment.

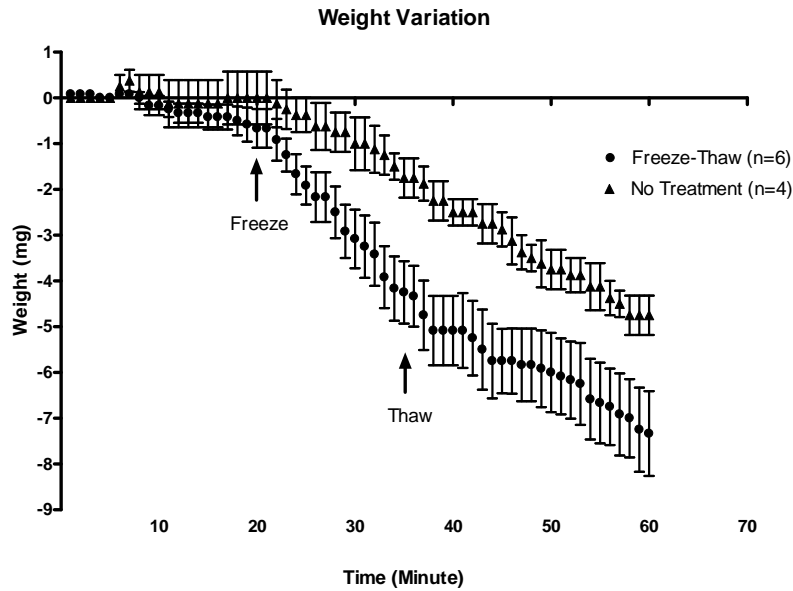


Figure 5. Weight variations under remote manipulations of water quantum-entangled with water being weighed. The weight at the starting point is set to zero and the results shown were obtained from one batch of quantum-entangled water. The weight differences from control in which no freeze-thaw was done at the point of thawing is about 2.5mg . In some cases, the weight of the water being weighed not only briefly stop dropping for several minutes but also rose briefly for several seconds to minutes as shown in Figure 5A. Also when the remote water was quickly heated to boiling on a stove instead of being frozen in liquid nitrogen, a brief rise of weight in the range of about 0.5mg were repeatedly observed in one variation of the key setup. Further, when the remote water was poured into a 200-gallon water tank, small but noticeably increased weight losses were also observed in several experiments conducted to date. Statistical analysis performed on data collected after freezing for 10min show that the results are significantly different under the different treatments/settings shown.

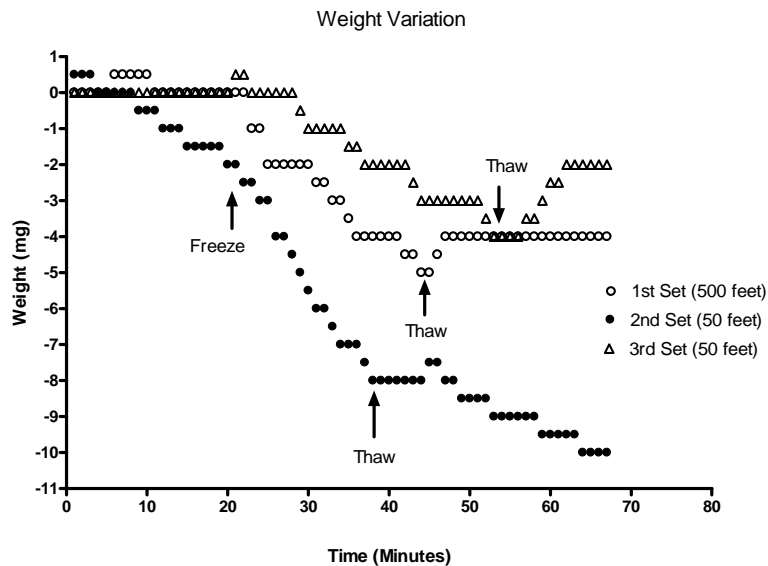


Figure 5A. Examples of weight variations under remote manipulations of water quantum-entangled with water being weighed. The onset of increased weight loss started either at the time of freezing treatment or slightly later. The signatures of thawing induced weight increases were clear for the three different thawing times. The distances shown are the respectively distances of the Dewar to the location of measurement in each experiment.

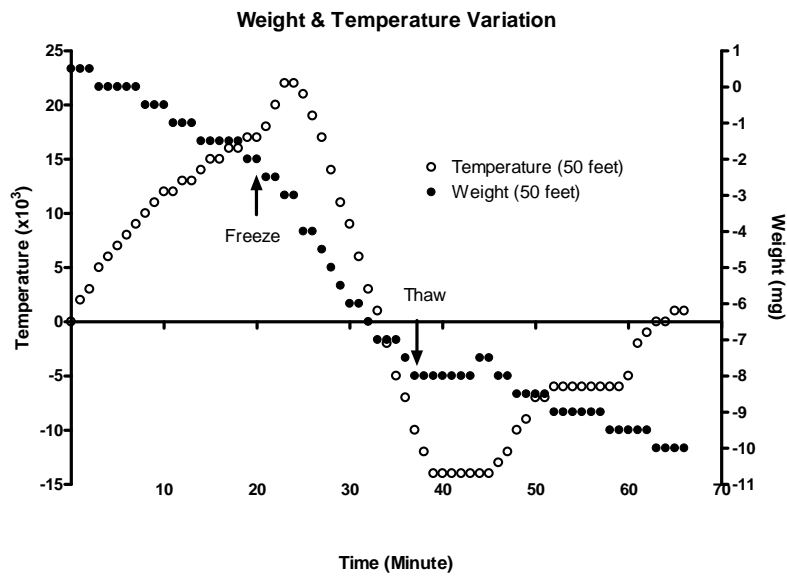


Figure 5B. One example of weight and temperature variations under the same remote manipulation of water quantum-entangled with water being weighed and measured respectively. The onset of increased weight loss started at the time of freezing treatment but the onset of temperature decrease against environmental temperature started a few minutes later after freezing treatment started. The signatures of thawing induced weight and temperature increases were clear. The distance shown is the distance of the Dewar to the location of measurement.

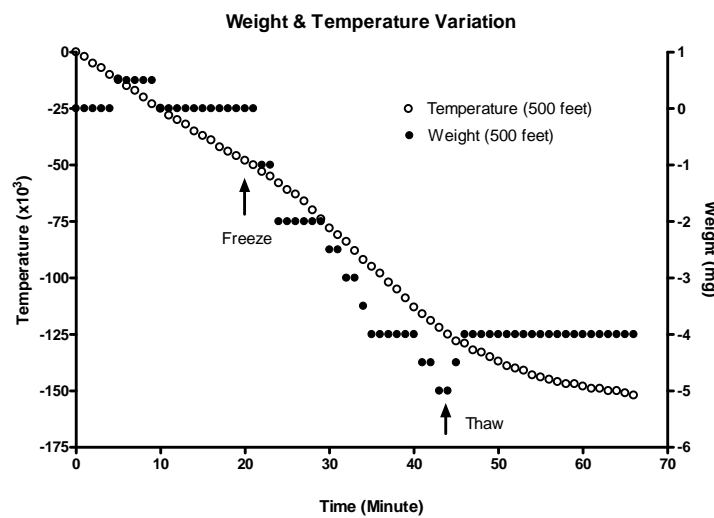


Figure 5C. Second example of weight and temperature variations under another same remote manipulation of water quantum-entangled with water being weighed and measured respectively. The general background trend of decreasing temperature was due to environmental temperature change. The onset of increased weight loss started at the time of freezing treatment but the onset of increased temperature loss started a few minutes later after freezing treatment started. The signatures of thawing induced weight increase and slow down of temperature loss were again clear. The distance shown is the distance of the Dewar to the location of measurement.

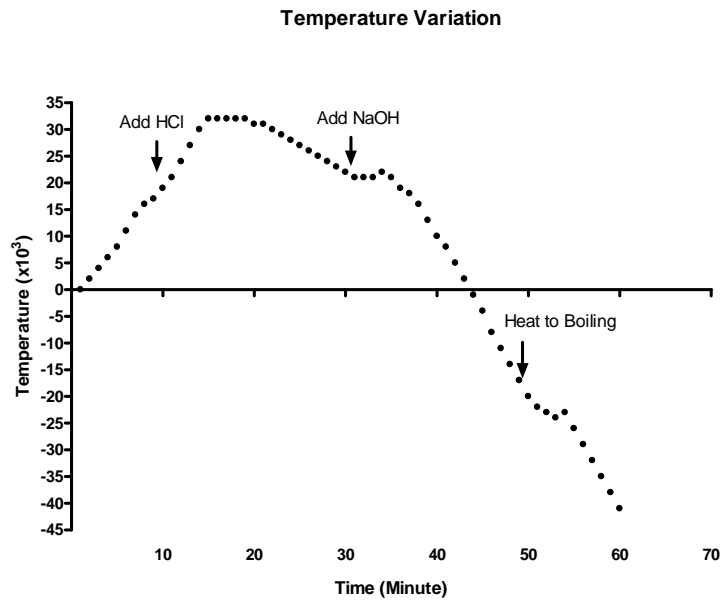


Figure 6. An example of temperature variations under the respective treatments of adding 5ml concentrated HCl (38%) to the third reservoir, then adding 20g NaOH to the same and third heating the same to boiling point. The signatures of these remote treatments induced temperature changes were clear and repeatedly observable in quite a few experiments conducted to date. The general background trend of the temperature first increasing, flattening and decreasing was due to environmental temperature change.

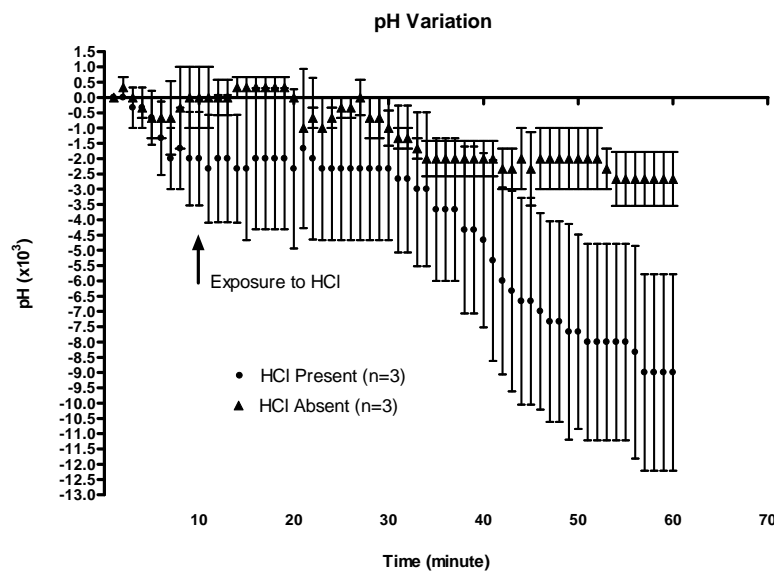


Figure 7. pH variations under laser treatment in the presence and absence of concentrated HCl with the setup in Figure 2. The pH value at the starting point is set to zero. The difference in pH value from control in which HCl was absence is about 0.07 after 50min of exposure to HCl. Various experiments done with direct additions of HCl to the remote water also repeated showed decreases in pH value in the water being measured. Statistical analysis performed on data collected after exposure to HCl for 30min show that the results are significant different from control.

References

- Chanelière T et al. Storage and retrieval of single photons transmitted between remote quantum memories. *Nature* 2005; 438: 833-836.
- Eberhard P. Bell's theorem and the different concepts of locality. *Nuovo Cimento* 1978; 46B:392-419.
- Gershenfeld N, Chuang IL. Bulk spin resonance quantum computation. *Science* 1997; 275: 350-356.
- Ghosh S, Rosenbaum TF, Aeppli G, Coppersmith SN. Entangled quantum state of magnetic dipoles. *Nature*: 2003; 425: 48-51.
- Hestenes D. Quantum mechanics from self-interaction. *Found. Phys.* 1983; 15: 63-78.
- Hu H. & Wu M. Spin-mediated consciousness theory. *arXiv* 2002; quant-ph/0208068 (2002). Also see *Med. Hypotheses* 2004a; 63: 633-646.
- Hu HP, Wu MX Thinking outside the box: the essence and implications of quantum entanglement. *NeuroQuantology* 2006a; 4: 5-16.
- Hu HP, Wu MX. Photon induced non-local effects of general anesthetics on the brain. *NeuroQuantology* 2006b; 4: 17-31. Also see *Progress in Physics* 2006c; v3: 20-26.
- Julsgaard B, Kozhekin A, Polzik ES. Experimentally long-lived entanglement of two macroscopic objects. *Nature* 2001; 413: 400-403.
- Khitrin AK, Ermakov VL, Fung BM. Information storage using a cluster of dipolar-coupled spins. *Chem. Phys. Lett.* 2002; 360: 161-166.
- Matsukevich DN & Kuzmich A. Quantum state transfer between matter and light. *Science* 2004; 306: 663-666.
- Salesi G, Recami E. Hydrodynamics of spinning particles. *Phys. Rev.* 1998; A57: 98-105.
- Tegmark M. The importance of quantum decoherence in brain processes. *Phys. Rev.* 2000; 61E: 4194 (2000).