Evidence of Non-local Chemical, Thermal and Gravitational Effects

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Quantum entanglement is ubiquitous in the microscopic world and manifests itself macroscopically under some circumstances. But common belief is that it alone cannot be used to transmit information nor could it be used to produce macroscopic non-local effects. Yet we have recently found evidence of non-local effects of chemical substances on the brain produced through it. 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 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 apparently can also change against local gravity. These non-local effects are all reproducible and can be used for non-local signalling and many other purposes. We suggest that they are mediated by quantum entanglement between nuclear and/or electron spins in treated water and discuss the implications of these results.

1 Introduction

Scientific methods 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 [1, 2]. Indeed, spins of electrons, photons and nuclei have now been successfully entangled in various ways for the purposes of quantum computation and communication [3, 4]. On the other hand, we have recently observed non-local effects of chemical substances on the brain produced through quantum entanglement [5, 6] which are commonly thought to be impossible [7]. 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 also change under non-local influences.

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 210 g, resolution 0.1 mg, repeatability 0. 1mg and sensitivity drift 3PPM/°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 and methods

Quantum-entangled stock water in individual volumes of 500 ml or similar quantities was prepared as described previously [5] which might then be split into smaller volumes or combined into larger ones based on needs.Briefly, in one procedure 500 ml fresh tap water in a closed plastic reservoir was exposed to microwave radiation in a 1500 W microwave oven for 2 min and then left in room temperature for 24 hours

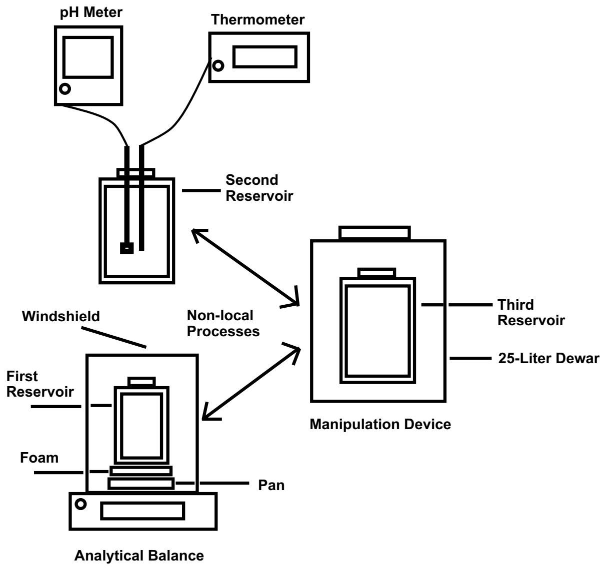

Fig. 1: Illustration of the key experimental setup. Several variations of this setup were also used in the actual experiments as described in the text. For example, in one variation, the manipulation was heating the water in the 3rd reservoir to boiling point and then cooling it down. In a second variation, the gravity measurement was eliminated and the manipulations were first adding 5 ml concentrated HCl (38%) to the third reservoir, then adding 20 g 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.

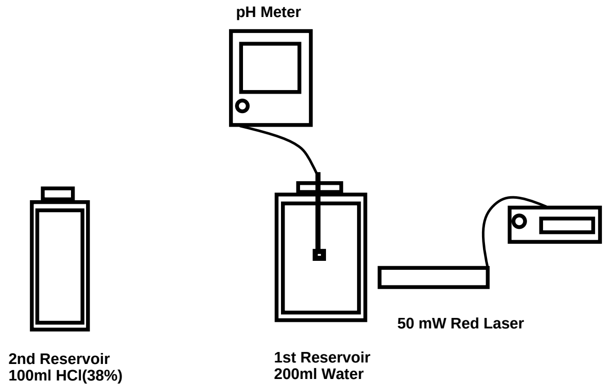

Fig. 2: Illustration of the second experimental setup which allows the measurement of pH value in the presence or absence of concentrated HCl about 500 cm away from and behind the water being measured. If no quantum entanglement is involved, the presence or absence of the HCl should not affect the pH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

before use. In a second procedure 500 ml fresh tap water in the closed plastic reservoir was exposed to audio-frequency radiations of a 20 W magnetic coil for 30 min and then left in room temperature for 24 hours before use. In a third procedure, 500 ml bottled natural water was simply left in room temperature for at least 30 days before use. In a fourth procedure, 500 ml 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 [5].

Figure 1 shows a diagram of the key experimental setup. 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 175 ml water split from the 500 ml 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 75 ml water split from the 500 ml 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 250 ml water split from the 500 ml 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 500 ml quantum entangled stock water, divide the same into 175 ml, 75 ml and 250 ml 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 30 min before any measurements is taken; (3) record for 20 min 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 15 min 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 30 min 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 5 ml concentrated HCl (38% by weight) was first added, then 20 g 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

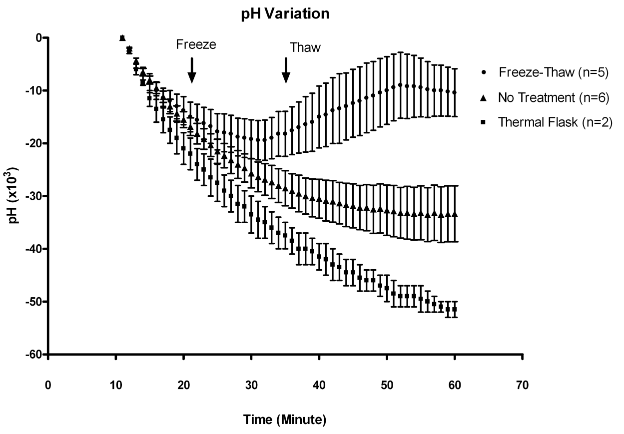

Fig. 3: pH variations under remote manipulations of water quantum-entangled with water being measured. The pH value at the starting point is set to zero and the results shown were obtained from one batch of quantum-entangled water. The difference in pH values from control in which no freeze-thaw was 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 10 min show that the results are significantly different under the different treatments/settings shown.

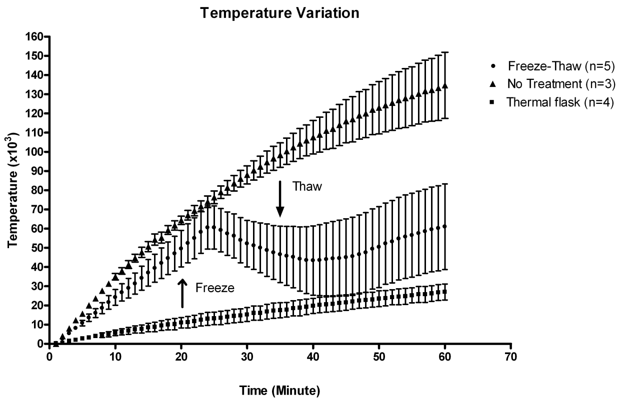

Fig. 4: Temperature variations under remote manipulations of water quantum-entangled with water being measured. The temperature at the starting point is set to zero and the results shown were obtained from one batch of quantum-entangled water. The temperature difference from control in which no freeze-thaw 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 10 min show that the results are significantly different under the different treatments/settings shown.

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. It includes: (1) a red laser with a 50 mW output and wavelengths 635–675 nm placed next and pointed to a flat glass first-reservoir containing 200 ml 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 100 ml concentrated HCl (38% by weight) to be placed 500 cm away from the first-reservoir at a specified time.

Experiments with the above second setup were carried out as follows: (1) prepare the 200 ml 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 30 min before any measurement is taken; (2) record for 10 min minute-by-minute changes of pH value and optionally temperature of the water in the first-reservoir; and (3) place the second reservoir containing 100 ml HCl on the path of the laser light and at a distance of 500 cm from the first reservoir and record for 60 min 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°C to −193°C, the pH value of the water in the second reservoir steadily stopped dropping and then started rising, but about 20 min after the

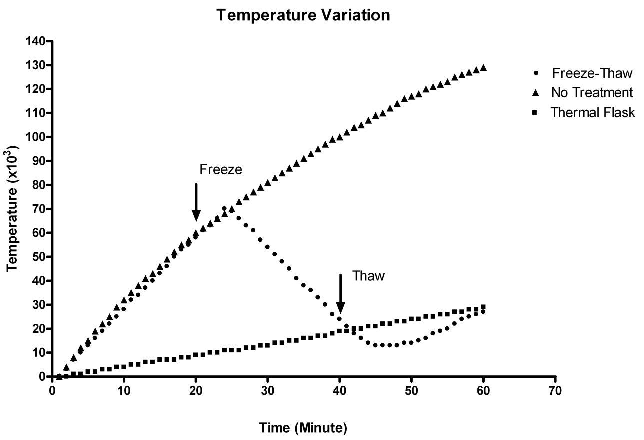

Fig 4A: One particular example detailing temperature variations under remote manipulation. The temperature difference from control at the point of thawing is about 0.08°C. However, if the water being measured is kept in a thermal flask, no dropping of temperature were observed under freeze-thaw treatment.

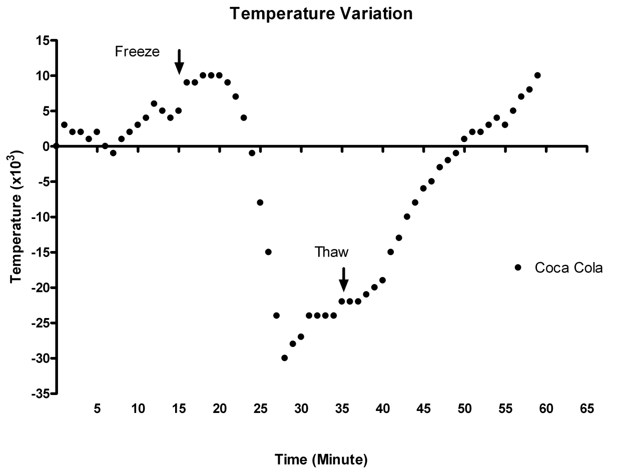

Fig 4B: One example showing temperature variation of a different liquid, Coca Cola, under remote manipulation of a portion of the said liquid quantum-entangled with another portion of the liquid being measured. Other liquids such as distilled water, olive oil and alcohol also showed similar qualitative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

frozen water was taken out of liquid nitrogen and thawed in warm water the pH value of the same steadily levelled 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°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 10 minutes 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 10 minutes 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

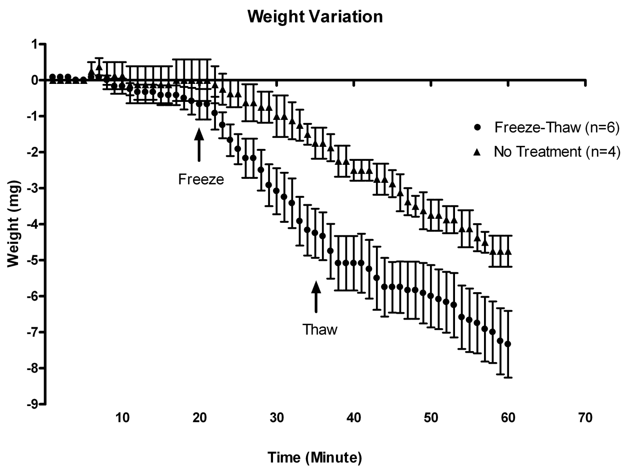

Fig 5: Weight variations under remote manipulations of water quantum-entangled with water being weighed. The weight at the starting point is set to zero and the results shown were obtained from one batch of quantum-entangled water. The weight differences from control in which no freeze-thaw was done at the point of thawing is about 2.5 mg. 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 Figure5A. 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 0.5 mg were repeated 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 10 min show that the results are significantly different under the different treatments/settings shown.

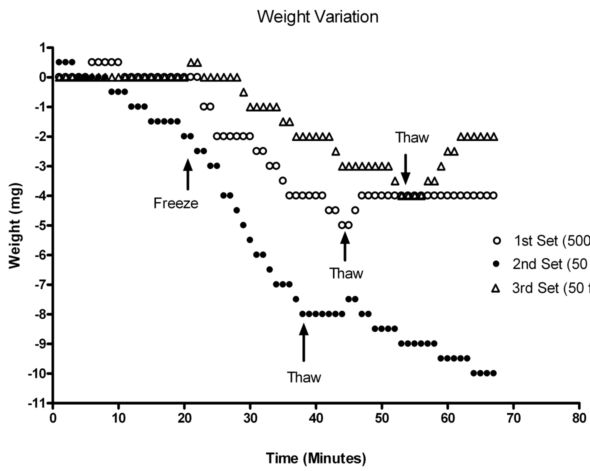

Fig 5A: Examples of weight variations under remote manipulations of water quantum-entangled with water being weighed. The onset of increased weight loss started either at the time of freezing treatment or slightly later. The signatures of thawing induced weight increases were clear for the three different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

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 2.5 mg. Statistical analysis performed on data collected after freezing for 10 minutes 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 0.5 mg were repeated 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 5 ml concentrated HCl (38%) to the third reservoir, then adding 20 g 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

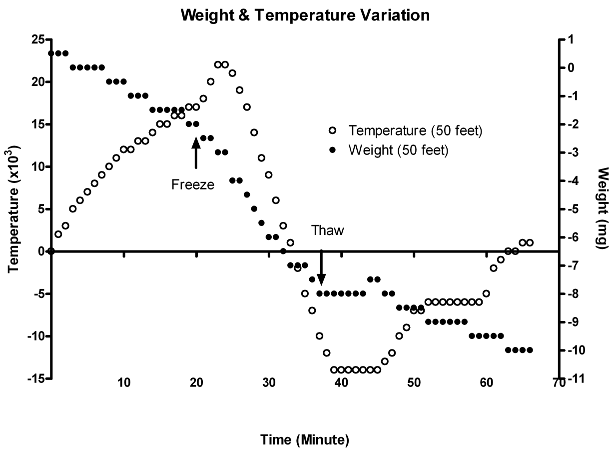

Fig 5B: One example of weight and temperature variations under the same remote manipulation of water quantum-entangled with water being weighed and measured respectively. The onset of increased weight loss started at the time of freezing treatment but the onset of temperature decrease against environmental 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.

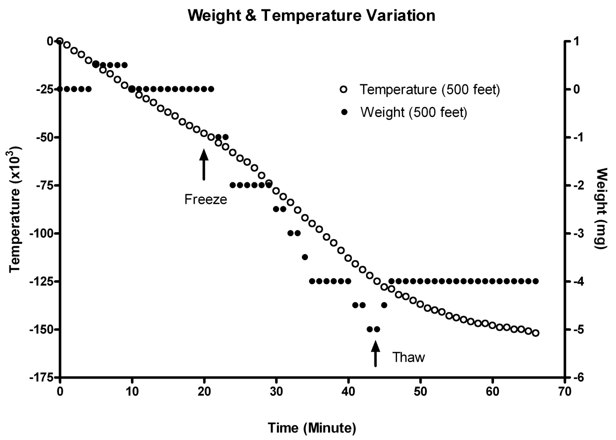

Fig 5C: Second example of weight and temperature variations under another same remote manipulation of water quantum-entangled with water being weighed and measured respectively. The general background trend of decreasing temperature was due to environmental temperature change. The onset of increased 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.

the first reservoir in experiments done with the setup in Figure 2. As shown, in about 30 min after the second-reservoir containing 100 ml concentrated HCl (38% by weight) was placed behind the first-reservoir at a distance of 500 cm 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 50 mW 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 50 min of exposure to HCl. Statistical analysis performed on data collected after exposure to HCl for 30 min 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 Discussions

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 likely 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 175 ml water in the first-reservoir is about 60 J. In contrast, the weight loss during remote manipulation was on average about 2.5 mg 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 0.03 mg 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, we cautiously suggest that 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

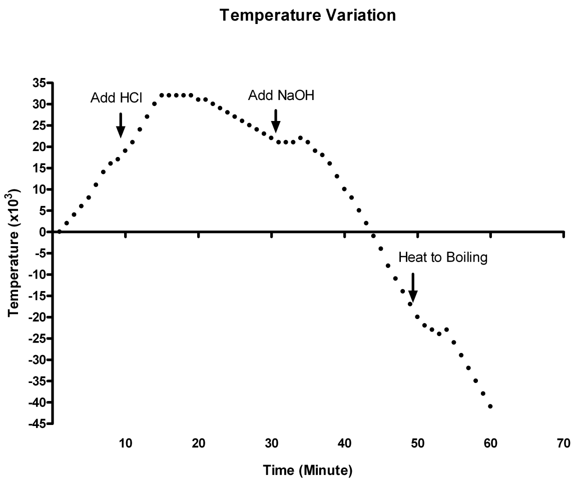

Fig 6: An example of temperature variations under the respective treatments of adding 5 ml concentrated HCl (38%) to the third reservoir, then adding 20 g NaOH to the same and third heating the same to boiling point. The signatures of these remote treatments induced temperature changes were clear and 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.

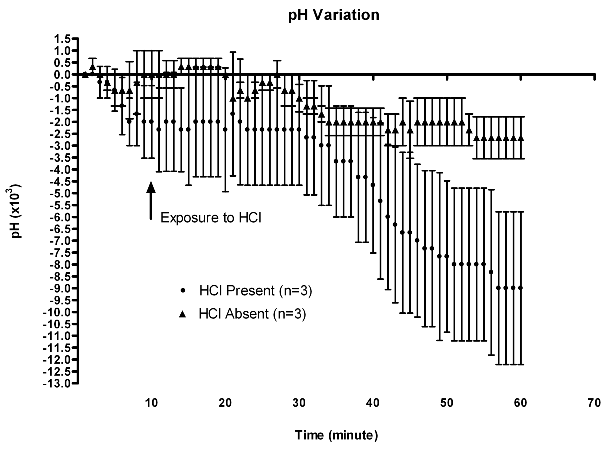

Fig 7: pH variations under laser treatment in the presence and absence of concentrated HCl with the setup in Figure 2. The pH value at the starting point is set to zero. The difference in pH value from control in which HCl was absence is about 0.07 after 50 min of exposure to HCl. Various experiments 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 30 min show that the results are significant different from control.

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 even possibly gravitational properties of the water might be affected through quantum entanglement mediated non-local processes [5, 6]. 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 though extreme cooling, heating or mixing with large quantum-entangled mass, e.g., water, such that, it is hereby cautiously suggested, 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 presumed non-local influence of the manipulation reservoir mediated through quantum entanglement. However, independent and vigorous replications should be carried out before a definite conclusion is drawn.

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 [8]. 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 [9]. Long-lived entanglement of two macroscopic electron spin ensembles in room temperature (0.05 ms) has also been achieved [1]. Furthermore, spin is a fundamental quantum process and was shown to be responsible for the quantum effects in both Hestenes and Bohmian quantum mechanics

[10, 11]. Thus, we suggest that quantum-entangled nuclear spins and/or electron spins are likely the mediators of all observed non-local effects reported here [5, 6].

5 Conclusions

Several important conclusions can be drawn from our findings. First, we have realized non-local signalling using three different physical observables, pH value, temperature and apparently gravity. Second, we have shown 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 the detecting reservoir is able to exchange heat with its local environment. Third, we have also shown that the gravity of water in a detecting reservoir quantum entangled with water in a remote reservoir apparently also change when the latter was remotely manipulated. Our findings imply that the properties of all matters can be affected non-locally through quantum entanglement mediated processes.

Finally, with respect 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 signalling and communications between remote locations of arbitrary distances in various ways. Potentially, other novel and practical applications can also be developed based on our experimental findings.

Acknowledgements

We wish to thank Yongchang Hu for assisting the authors with some of the experiments and Danielle Graham for showing her research at a 2006 conference.

Submitted on November 16, 2006
Re-submitted after revision on November 23, 2006
Accepted on November 30, 2006

References

1. Julsgaard B., Kozhekin A., Polzik E. S. Experimentally long-lived entanglement of two macroscopic objects. *Nature*, 2001, v. 413, 400–403.
2. Ghosh S., Rosenbaum T. F., Aeppli G., Coppersmith S. N. Entangled quantum state of magnetic dipoles. *Nature*, 2003, v. 425, 48–51.
3. Matsukevich D. N. and Kuzmich A. Quantum state transfer between matter and light. *Science*, 2004, v. 306, 663–666.
4. Chanelière T. et al. Storage and retrieval of single photons transmitted between remote quantum memorie. *Nature*, 2005, v. 438, 833–836.
5. Hu H. P. and Wu M. X. Nonlocal effects of chemical substances on the brain produced through quantum entanglement. *Progress in Physics*, 2006, v. 3 , 20–26; *NeuroQuantology*, 2006, v. 4, 17–31.
6. Hu H. P. and Wu M. X. Thinking outside the box: the essence and imications of quantum entanglement. *NeuroQuantology*, 2006, v. 4, 5–16; Cogprints: ID4581.
7. Eberhard P. Bell's theorem and the different concepts of locality. *Nuovo Cimento*, 2004, v. 46B, 392–419.
8. Gershenfeld N. and Chuang I. L. Bulk spin resonance quantum computation. *Science*, 1997, v. 275, 350–356.
9. Khitrin A. K., Ermakov V. L., Fung B. M. Information storage using a cluster of dipolar-coupled spins. *Chem. Phys. Lett.*, 2002, v. 360, 160–166.
10. Hestenes D. Quantum mechanics from self-interaction. *Found. Phys.*, 1983, v. 15, 63–78.
11. Salesi G. and Recami E. Hydrodynamics of spinning particles. *Phys. Rev.*, 2004, v. A57, 98–105.