Quantum entanglement-like behaviour in a dowsing experiment

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Abstract

Quantum mechanical entanglement-like behaviour has been observed during the investigation of the dowsing effect. Interference fringe patterns, a hallmark of wave behaviour, have been observed when parallel copper tubes are placed on the ground. The fringes can be mapped using right angled dowsing rods. When the tubes are touched together and then replaced in their original position the fringe pattern changes in a manner that suggests that the tubes are "entangled". This change persists until "decoherence" occurs due to environmental interactions or deliberate physical actions.

Polarisers that use a class of materials that have no effect on electromagnetic waves but act as polarisers for dowsing radiation are used to investigate radiation passing between the tubes. The polarisers are used both to screen from interference and to facilitate measurement of the characteristics of the radiation.

Blind testing has suggested with a 6 sigma confidence level that dowsing rods can be used to detect changes in interference fringe patterns created by the copper tubes both when they are "entangled" with one another and when they are decoherent. It has also demonstrated at 5 sigma level that the radiation has a wavelength of 21.1 cm, and is circularly polarized.

The use of non-conventional material for the polarisers indicates that the radiation is not electromagnetic in nature and suggests a testable proposition that the radiation that causes the dowsing entanglement effect is one and the same as that which creates entanglement in quantum physics.

KEYWORDS radiation, interferometer, polariser, fringes, entanglement, decoherence, quantum, dowsing

Introduction

In the context of this study the terms entanglement and decoherence are used to describe effects which are similar to those in quantum mechanics but which have been observed in the materials used in the experiments.

It is acknowledged that dowsing is a highly controversial subject. It is an ancient practice that was described by Agricola [1] in 1556 and from then until this day has been widely used world wide to locate underground structures, mineral veins and water. There have been many dowsing studies carried out to attempt to show that results can be replicated, but as yet little positive evidence has emerged.

The problem with previous dowsing replication attempts appears to be that there were factors that were not understood and therefore not controlled. The current work attempts to mitigate as many factors as possible.

The main factors in question include:

1. Sunspot activity that causes chaotic polarisation behaviour of excitation radiation from the sun.
2. Interference effects that appear to travel east to west around the planet.
3. Items such as rings, jewellery, watches and belts that are carried on the body and interfere with measurement.
4. Clothing made from man-made fibres that cause spurious polarization effects.
5. Dowsing fringe persistence effects.
6. Interactions between experimental test pieces and between the test pieces and the built environment.

There is a mysticism surrounding dowsing, partly because of the widely held perception that only a select few of the general population have the ability to use angled rods as detectors. However simple tests indicate that this may not be the case and that more than 70% of the population may have this ability, although it does take a little time to develop skills for their use.

(Reddish 1998) describes, in a dowsing context, the use of interferometers having two parallel linear elements. These are so-called because they generate a pattern of interference fringes that can be detected using dowsing rods. Further work describing the use of interferometers has been described (Dodd et al., 2002)

The ability to detect dowsing interference fringes is central to this study. It would be ideal if inanimate detectors could be used. However currently this is not possible and hand held angled rods must be used instead. The development of detectors in any field relies on an understanding of the properties of the effect being studied and it is only recently that such an understanding has begun to emerge in relation to dowsing. The development of inanimate detectors is an ongoing task.

The detectors used to measure the position of fringes are hand held right angled rods. The rod dimensions are not critical but the ones used are of copper 3mm in diameter, 16cm on the short arm and 26cm on the long arm. A rod is held in each hand with the thumb upright and four fingers clasped loosely around the short arm. In use the hands are held at the sides, close to the waist with the long arm of the rods facing forwards. As the holder of the rods moves forward, when a fringe is crossed the rods swing inwards because of muscle action. When using rods it is important that no rings or other metallic items are worn.

In the experiments described here, 15mm copper tubes which are spaced apart are used to form an interferometer. They appear to be excited by radiation from the Sun and generate secondary radiation that causes the formation of detectable dowsing fringes.

Polarisers formed from a sheet of polyethylene film are used to investigate the radiation being studied

(Akimov, 1997) in the former USSR was the director of the centre for Non-traditional Technologies, later known as CISE VENT (Kernbach, 2013) In his paper Akimov refers to material having a spin-ordered molecular structure and that A. Samokhin in 1989 (no reference given) carried out preliminary experimental testing of the screening action of polyethylene films.

Polarisers are widely used in optics and electromagnetics. Two polarisers arranged with their polarisation directions orthogonal to each other will block electromagnetic radiation. Polyethylene film polarisers have similar properties for radiation observed in dowsing experiments.

Polyethylene film is stretched in one direction during manufacturing, creating a molecular-level analogue of the grid of fine wires that is sometimes used as a polariser for electromagnetic radiation. Other materials such as aluminium sheet whose manufacturing process stretches the material in one direction have similar properties.

In this study polyethylene and other materials are used to shield experimental apparatus from unwanted external radiation and to make measurements on the unknown radiation passing between the components of the interferometer.

The materials used to construct the experimental equipment are important in that they must not affect any measurements. (Wöst and Wimmer, 1934) reported that there were classes of elements which, when placed together, could not be detected by dowsing rods. They suggested the possibility of producing and using non-radiative combinations of metals. J. Harris (personal communication) has investigated such combinations and advised that brass, being an alloy of copper and zinc, would be minimally or non-detectable so brass is used for all metalwork.

Medium Density Fibreboard (MDF) is used where sheet material is needed. The fibres in MDF are randomly dispersed at all angles with the result that it does not interact with the tubes used in the experiment. It was chosen over natural wood and metal sheet which both have unwanted polarisation properties.

Experiment 1

Experiment 1 tests whether fringes detectable by the use of dowsing rods are influenced by the entanglement between copper tubes and change when the tubes are no longer coherent.

Figure 1 shows the physical layout of the experiment
Copper tubes 15mm diameter and 47cm long were used.(neither of these dimensions are critical). The tubes were spaced 15m apart with tube **b** 12m outside the building on the other side of a large window. Tube **a** was inside. This arrangement prevented the measurement area being exposed to wind and weather.

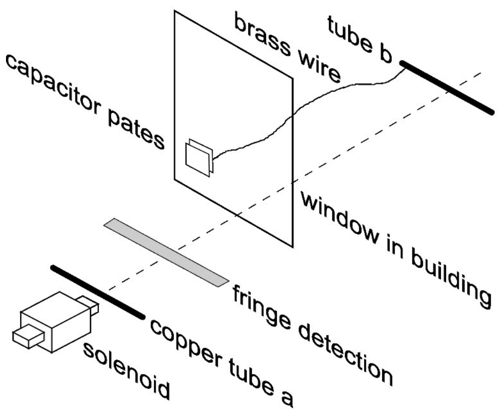

Figure 1: Experiment 1 physical layout

For each experimental run, tubes **a** and **b** had to be entangled, one way to do this was to touch them together. However to prevent the need to continually go outdoors, a scheme was adopted whereby an uninsulated 0.2mm diameter brass wire was laid a few cm deep in a slit cut in the outdoor soil. One end of the wire was connected to tube **b** and the other end to a 5cm x 5cm brass plate on the outside of a double glazed window. Another plate was mounted on the inside of the window, the pair forming a capacitor with a gap of approximately 20mm between the plates. To entangle **a** and **b**, **a** was physically touched to the inside plate of the capacitor and then replaced in its original position.

Following an initial entanglement the position of **a** was finely adjusted so that using right angled dowsing rods a fringe could be detected at a convenient position (When the tubes were not entangled no such fringe existed.)

A solenoid with a steel armature was mounted directly behind tube **a**. The solenoid had 3600 turns with 110 ohms resistance. Its energisation was controlled by a microcontroller, random generator and remote control. When the controller was triggered it either did nothing or pulsed the solenoid coil with a 6 second sequence of 0.5 seconds on and 0.5 seconds off. The purpose of the solenoid was to cause decoherence between tubes **a** and **b.** Decoherence can also be caused by sharply tapping either tube.

Procedure – experiment 1

1. Pick up tube **a** and touch it to the inside plate of the capacitor to entangle it with tube **b.**
2. Using dowsing rods, check that a fringe can be detected.
3. Use a remote control to trigger the random generator system to cause the solenoid to randomly apply a pulse sequence or not.
4. Use dowsing rods to determine whether the fringe is still present (**a** and **b** are still entangled) or whether there is no fringe in which case **a** and **b** have become decoherent.
5. Record the output state of the random generator.
6. Repeat the procedure

Experiment 2

This experiment was designed to test the theory that radiation responsible for the dowsing effect has a wavelength of 21.1 cm and is circularly polarised.

The background to this was an experiment in 2015 in which fringe distances were measured when copper tubes similar to those used in experiment 1 were moved apart. Figure 2 shows the results and provided the first hint that radiation with a wavelength of 21.1 cm may be involved. This result was confirmed by measurements made in France by C. M. Humphries (personal communication)

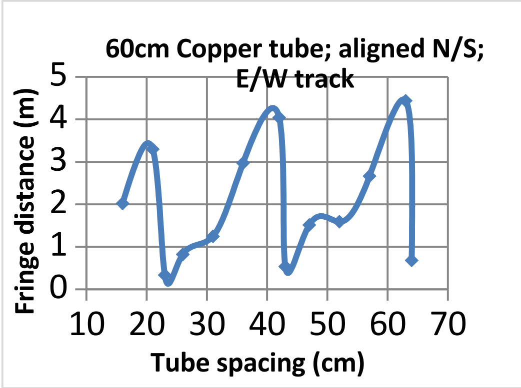

Figure 2: Fringe distance changes with tube spacing

The accuracy of the wavelength measurement was refined by spacing the tubes at multiples of 21.106 and then carrying out fine adjustment of the spacing so that the fringes were at as great an amplitude as possible. Over a spacing of 35 x 21.106 cm, the measured fringe was 119.5 cm reducing to 73.1 for +2cm and to 91.3 for -2cm spacing adjustment. A 2cm change in spacing is equivalent to a 2/35 error in wavelength so the error in wavelength measurement is 0.06cm. The measured wavelength was thus 21.106+-0.06 cm.

Following this earlier work two polarisers as shown in figure 3 were used to measure the characteristics of the radiation. The spacing between the polarisers was set to 21.1/4.

In operation, any 21.1 cm incoming radiation that passes through polariser **a** will rotate 90 degrees in the gap between **a** and **b** and will be passed through by **b**. If **b** is rotated by 90 degrees so that the stretch directions are parallel, the radiation is blocked

When the polariser pair was interposed between the copper tubes of the 2015 experiment it was found that this appeared to be the case.

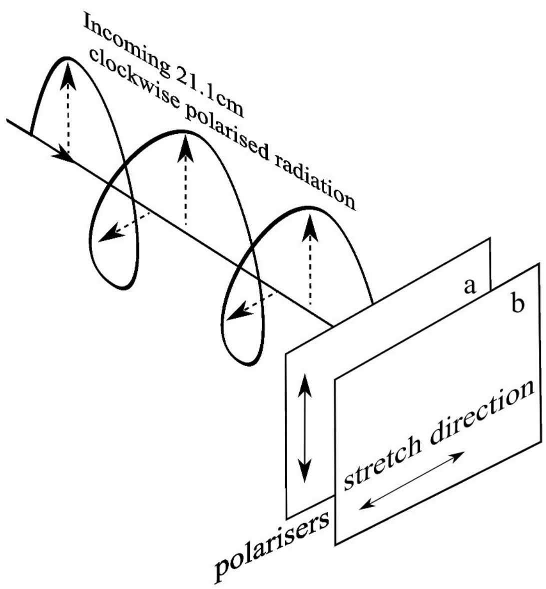

Figure 3: polarisers

To further test this effect the equipment shown in figure 4 was set up.

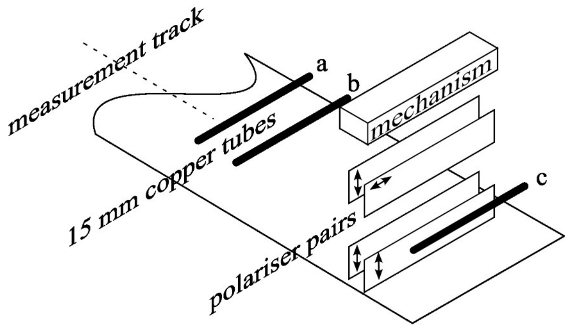

Figure 4: Experiment 2 - layout

Two polariser pairs as in figure 3 were arranged one above the other with a gap between them. The top pair had polariser stretch directions orthogonal to one another and the bottom pair parallel to one another.

Three copper tubes **a**, **b** and **c** were aligned on a horizontal plane with tubes **a** and **b** comprising an interferometer. Tube **c** was positioned on the other side of the polariser pairs.

A mechanism comprising an actuator, microcontroller, random generator and remote control was mounted above the polarisers and when triggered was able to move them vertically so that either the top pair or the bottom pair was randomly moved into the path between interferometer **a-b** and tube **c.**

The equipment was mounted on top of a radiation screen comprising MDF covered with crossed polyethylene. Its function was to prevent polarisation of the experimental area causing spurious fringes to be detected.

A second radiation screen (not shown) was arranged to the east side of the equipment to prevent spurious radiation that had been found to come from an easterly direction from interfering with the equipment and measurements.

Procedure – experiment 2

Initialisation.

1. With tube **c** removed, the position of the fringe caused by the **a-b** interferometer was marked along the measurement track.
2. The polariser pairs were set to their mid position so that radiation could pass from the **a-b** interferometer through the vertical gap between them to tube **c**.

3. Tube **c** was picked up and touched to **a** and **b** to form an entangled superposition, it was then placed in position as in figure 4.
4. The new position of the fringe along the measurement track was marked. If necessary the distance between the **a-b** interferometer and tube **c** was altered to ensure that the fringe could be distinguished from the previously detected fringe in step 1.

Measurement.

1. Start with the polariser pairs set to the mid position.
2. Pick up tube **c** and touch it to **a** and **b** to entangle them. Replace it in its original position.
3. Check that the fringe position corresponds to the entangled state of **a**, **b** and **c** determined during initialisation step 4.
4. Trigger the mechanism to cause either the top or bottom polariser pairs to move at random into the beam path between interferometer **a-b** and tube **c**.
5. Determine the position of the fringe and record whether its position corresponds to an entangled superposition of **a, b** and **c** or not.
6. Record the output state of the random generator.
7. Repeat the procedure.

Results

In experiment 1 64 trials took place out of which 52 gave a detectable fringe that corresponded to an entangled state between tubes **a** and **b.** The odds of this happening by chance are 50% but the results show that the liklihood of their being incorrect was 0.006% with σ = 4, Z = 5. This result indicates that entanglement and decoherence can be detected with a high degree of confidence. Of the 12 trials where entanglement failed to be correctly detected, 8 appeared to be caused by spontaneous de-coherence and 4 were situations where the solenoid failed to cause decoherence.

In experiment 2 100 trials took place out of which 76 gave fringe distance measurements that corresponded to the entanglement state of tubes **a**, **b** and **c** with σ = 5, Z = 5.2, p= 0.00003%. This result is highly significant. It indicates that stretched materials act as polarisers and that circularly polarised radiation with 21.1cm wavelength passes between entangled tubes.
Of the 24 trails where coherence was incorrectly detected, 8 appeared to be caused by spontaneous decoherence and 16 were believed to be caused by spontaneous entanglement with objects in the environment.

Experiment 1 answers the question of whether a dowser using angle rods is able to detect entanglement and decoherence in an experimental system comprising entangled copper tubes. Experiment 2 confirms the result of experiment 1 in this respect. It also answers the question of wavelength and polarisation.

A meta analysis of the two sets of results gives a total of 128 measurement from 164 trials, confirming that a dowser can correctly detect entangled states. This result has σ 6.4, Z score 7.19, p=0.000000007%, again indicating that the result is highly significant.

Conclusions

The results from experiment 1 and 2 are significant and show with a high degree of certainty that entanglement can take place between copper tubes in a measurement system, that such entanglement can be detected by an experimenter using right angled dowsing rods and that there is a radiation field involved that has a wavelength of 21.1cm and which is circularly polarised.

Experiment 2 meets the particle physics 5 sigma gold standard benchmark for claiming a discovery. The meta analysis score of σ 6.4 comfortably exceeds it.

Discussion

From the results of experiment 2 the question arises as to whether the 21.1cm radiation seen in the experiment is electromagnetic. In classical physics, 21.1cm radiation corresponds to electromagnetic radiation caused by a change in the energy state of electrically neutral hydrogen atoms. It has a corresponding frequency of 1420.41 MHz, a frequency in the electromagnetic microwave spectrum.

In 2002 tests were carried out in an electromagnetically screened laboratory at BAe Systems in Edinburgh. These tests concluded that electromagnetic screening had no effect whatsoever. (Dodd et al., 2002). This conclusion is strengthened by the fact that the polarisers used in this experiment have a stretched molecular structure that does not have any known effect on microwave electromagnetic radiation. To further support this conclusion it was found that at least one of the copper tubes used in the experiment must be excited by radiation from the sun. This radiation is present even when the sun is below the horizon at night time. 1420 MHz electromagnetic radiation is not known to pass through the planet.

16 trials in experiment 2 were classified as being incorrectly detected because of spontaneous re-entanglement. All 100 trials took place at the solar maximum, a point in the solar cycle where the sun's magnetic field changes. At the time of the trials it was observed that the excitation radiation from the sun was frequently chaotic and that it sometimes caused spontaneous entanglement to readily take place between objects in the built environment. Later work has shown that a laser can be used as an excitation source and holds the promise of reduced error rates.

In quantum mechanics the quantum teleportation phenomenon demonstrates instantaneous action at a distance by the action of quantum entanglement. In this experiment it appears that entanglement takes place when two or more copper tubes lock themselves in phase with 21.1cm radiation. The question as to whether the radiation between the tubes has an instantaneous effect is not answered.

(Lavrentiev et al. 1990) carried out an experiment that was able to detect radiation from the sun that appeared to emanate from the true position of the sun rather than its visible position. The implication of this is that the radiation had a near instantaneous action. Similar effects regarding the true position of the sun – not reported in this paper – have been observed using copper tubes and right angled dowsing rods.

The copper tubes used in this experiment have approximately 3.4 x 1025 electrons, this compares to the relatively few particles in current quantum mechanics experiments. It is however not unreasonable to speculate that the entanglement effects seen in this experiment and entanglement and quantum teleportation effects seen in quantum physics are two facets of the same underlying mechanism. This is testable experimentally by using dowsing polarisers to block radiation transmission in a quantum teleportation experiment.

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