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### Quantum Entanglement.....

From: Roy Hale <[roy.hale@virgin.net](mailto:roy.hale@virgin.net)>  
Date: Sat, 10 Apr 1999 16:31:05 +0100  
Fwd Date: Sat, 10 Apr 1999 16:25:33 -0400  
Subject: Quantum Entanglement.....

>From [roy.hale@virgin.net](mailto:roy.hale@virgin.net)  
Date: 10/4/99  
Time: 16:20  
Subject: Quantum Entanglement?

Dear Colleagues,

I received this rather interesting article concerning the "New" principle of Quantum Entanglement.

If this works as it suggests then surely this must lead to a fundamental re-think on the communication aspects of space research into the search for ET?

Could it be that applying the below principle' may well open the long awaited jump Man has been looking for to have an out-reach or a simplified code of communication with other Universal Intelligence's?

Read on..

#### QUANTUM ENTANGLEMENT DETHRONES UNCERTAINTY PRINCIPLE WITH HUGE REAL-WORLD IMPLICATIONS

A stunning revision of quantum theory has effectively replaced Heisenberg's uncertainty principle with the concept of quantum entanglement.

According to Heisenberg, writing in the early years of this century, both the momentum and position of a particle cannot be known at the same time, because the process of measuring the position changes the particle's momentum.

Previously, only "thought experiments" were available to test the theory, but this has changed, and the changes have huge implications in areas such as communications.

The change in theory has huge implications for communications at levels so deep they are just beginning to be realised and imagined.

The indeterminacy of reality at the quantum (tiny) level has been proved by the famous "two slit" experiment which proves that light is both a wave and a particle, depending on whether or not an effort is being made to measure it.

Even single particles, sent through the slits over a period of hours, will set up a pattern that proves that they pass through both slits at the same time and interfere with themselves. Quantum theory has therefore said that a particle splits into two "ghosts" of itself, one going through each slit.

It wasn't possible to confirm this because measuring the actual position of the particles altered their motion, just as Heisenberg had predicted.

Now it has become clear that the apparent "ghosting" is not due to some mysterious and inaccessible aspect of reality, but to an actual, physical effect that can be understood and exploited in all sorts of incredible "quantum machines," especially devices that can enable instantaneous communication, possibly over infinite distances with no time lag.

In 1997, physicist Nicolas Gisin and colleagues at the University of Geneva in Switzerland used particles of light that had been entangled by linking their spins to engage in simple but instantaneous communication over a distance of 7 miles.

When the spin of one entangled particle was again changed after the two had been sent down separate fiber-optic cables, the other particle instantaneously made the same movement. There is no theoretical limit to the distance at which this could be accomplished, and the small size of individual photons implies that incredibly detailed and instant communications could eventually be accomplished.

More recently, Gerhard Rempe and colleagues at the University of Konstanz in Germany have effectively measured the actual motion of the particles in the "two slit" experiment without interfering with it.

Incredibly, what was revealed was that the process of measurement STILL ended the interference pattern, even though it did not transmit enough energy to the particles to change their momentum. What this proves is that particles are linked in such a way that one moves when the other is pushed.

In effect, they act as a single object even though they exist in different places. "Loss of interference is always due to entanglement," said physicist Yu Shi at the University of Cambridge.

So now the question becomes, just how deep is this linking and how extensively can it be exploited for real-world gain?

For example, is everything linked? If the big bang happened, then there was a time prior that all particles now existing in the universe were packed tightly together. Does the "ghost" of this linkage still haunt the universe, and can it be exploited to extend man's vision to the infinite?

If so, it could be an explanation of why SETI (The Search for Extraterrestrial Intelligence) being conducted on radiotelescopes around the world is not finding any signals. When such a rich and speedy communications process exists, why use radio?

Thanks to Nature and The New Scientist. Further reading "Origin of quantum mechanical complementarity probed by a 'which-way' experiment in an atom interferometer," S. Durr, T. Nonn, G. Rempe, Nature vol. 395, p. 33. "An End to Uncertainty," Mark Buchanan, The New Scientist 6 March 1999, "Light's spooky connections set distance record," Mark Buchanan, The New Scientist, 28 June 1997.

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