Theoretical Ansible: Exploring Quantum Entanglement for Communication

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Abstract

I am not at all a physicist, I am a Mathematician and a Computer Scientist. I understand only high level concepts within physics so I am still unsure whether or my theoretical model can be made or not. Nevertheless I used GPT 3.5 as an advanced rubber ducky to bounce Ideas off of and research concepts within physics that I didn't quite understand yet. GPT 3.5 wrote my original paper entirely, which was amazing to me that it was able to string together my ideas so coherently. My second draft of my paper included a few modifications for clarity but still GPT 3.5 rewrote it to include an update to my mechanical model that in my honest opinion was the final piece of the puzzle. My third and current draft of this paper is a heavy rewrite of the paper to make it much more human readable and less dis-believable. Enjoy!

1 Introduction:

The Ansible is a fictional device that aims to achieve faster-than-light communication. The theoretical Ansible schematics I designed are for a communication device that leverages the principles of quantum entanglement to enable almost instantaneous communication over vast distances. This theoretical framework proposes; the tethering and anchoring of quantum particles at separate locations, harnessing their entangled properties to encode and transmit information, and employing a spatially distributed network of entangled particles thereby utilizing their correlated states to create a new world Internet.

2 Principles of Quantum Entanglement:

Quantum entanglement is a phenomenon in which two or more particles become correlated in such a way that the state of one particle is instantaneously dependent on the state of the other, regardless of the physical distance between them. To be specific entangled particles have a reflected spin around the same "fixed" axis of rotation. Imagine one particle moves counter-clockwise and one move clockwise. This non-local connection, famously referred to as "spooky action at a distance" by Albert Einstein, allows for the transmission of information without the need for traditional signal propagation. We will further discuss the implications of this assumption later but it suffices to say that this is the only assumption need to be made for my schematics to work properly. To be specific we assume that it is possible to reflect a tilt in the axis of rotation of two entangled particles by changing the orientation of one of the particles rotational axis and having it instantaneously reflected in the other.

3 Preliminaries:

The schematics for the Ansible are relatively straight forward. Imagine an anchor, a straight line tether attached to it and a entangled particle at the very other end of the tether. Now imagine that the anchor cannot move from its position, let's say that it is at coordinates (0,0,0). Now the resting position of the entangled particle should probably be (0,1,0) because spatially it will be recognized as directly above the anchor 1 unit away from it. Note: the tether is 1 unit long. Imagine that the anchor can have rotational forces applied to it and now this is the basis of my Ansible schematics. The entangled particle may only ever have coordinates on the unit sphere centered about (0,0,0).

4 Straight Line Movement and Data Encoding:

To encode data using the Ansible, the tethered entangled particles move in straight lines along a square pattern across the surface of the unit sphere. The position and orientation of the particles encode the data, and changes in their states at specific points along the trajectory carry the transmitted information. By carefully controlling the movement of the particles, complex data patterns can be formed and decoded at the receiving end.

5 Spin Alignment and Statistical Analysis:

Imagine there being a sender and a receiver, the sender rotates itself so that it is centered upon a neighboring square instead of it's orignal square. Now the sender updates the entangled particles rotational axis to be in line with the normal vector generated from the tethers direction (should be exactly the new squares center coordinates). Since this should reflect a change in the receivers rotational axis it should then start failing a precise amount of tests on whether the particle is aligned or not. Then the misaligned receiver should then guess which neighboring square contains the new rotational axis. The misaligned receiver should most likely get close to one-hundred percent accuracy once it finds the correct neighboring square to move to. In this way we are able to find the senders input in the receiver by path searching for the most statistically probable next square to realign itself to. I suggest that although an entire sphere cut up into squares might sound fun what is only really needed is a resting square and two neighboring squares for this device to function as that is enough to encode 0's and 1's. In vain of this idea I suggest a protocol for moving information. The sender changes its orientation and rotational axis to match then the receiver reads which square it was supposed to move to, reads the data point, then goes back to the resting position and reflects that rotational axis back to the sender. The sender then knows that the receiver has received a bit, The sender then realigns itself back to the resting position and begins again.

6 Manipulation of an Entagled Particles Spin:

I suggest a thought experiment to test my hypothesis that the axis of rotation for an entangled particle is reflected upon the other. If we examine two entangled particles independently and since interference is inevitable, how do these particles ever stay entangled? My idea is that interference cause these rotational axes to wobble slightly but remain relatively close to its original orientation, we can observe this wobbling effect and calculate just how random each natural wobble motion is between two entangled particles. A better experiment would be to allow for a purposefully large amount of interference to occur on only one particle only to test them again to see if they match after one particle has had it's rotational axis shifted. My hypothesis is that "spooky action at a distance" meant to Einstein that the wobbling motion of two entangled particles was in fact mirrored upon each other. Imagine a dropped circular plate dropped on the floor at its final moments before resting. I imagine this is how the wobbling motion of an entangled particle must look like.

7 Conclusion:

The theory for my design of an Ansible offers a fascinating exploration of using quantum entanglement for high-speed communication. Although it remains in the realm of theoretical speculation, it highlights the potential of harnessing the peculiar properties of quantum mechanics for revolutionary advancements in information transmission. Further research and development in quantum technologies will shed light on the practicality and limitations of the theoretical Ansible concept.

References

ChatGPT 3.5