

Communication through entanglement transfer

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Abstract

In our previous paper [1] we claim that based on conservation laws (e.g. spin, angular momentum, gravity, time dilation etc.) in some cases, matter and antimatter pairs (e.g. electron and positron pair) produced from photonic pure energy are entangled. Furthermore, if there are two identical pair production procedures, A & B, and an electron from entangled pair A annihilates with the positron of entangled pair B, from conservation laws consideration the left behind positron from pair A and the left behind electron from pair B become entangled and we will refer to this event as entanglement transfer (Fig. 1). This phenomena can be examined at the LHC and if proven to be correct it is another proof that entanglement is truly a “spooky action at a distance” (EPR paradox). As we will explain in this paper, This phenomena of entanglement transfer can be used for non-local communication applications.

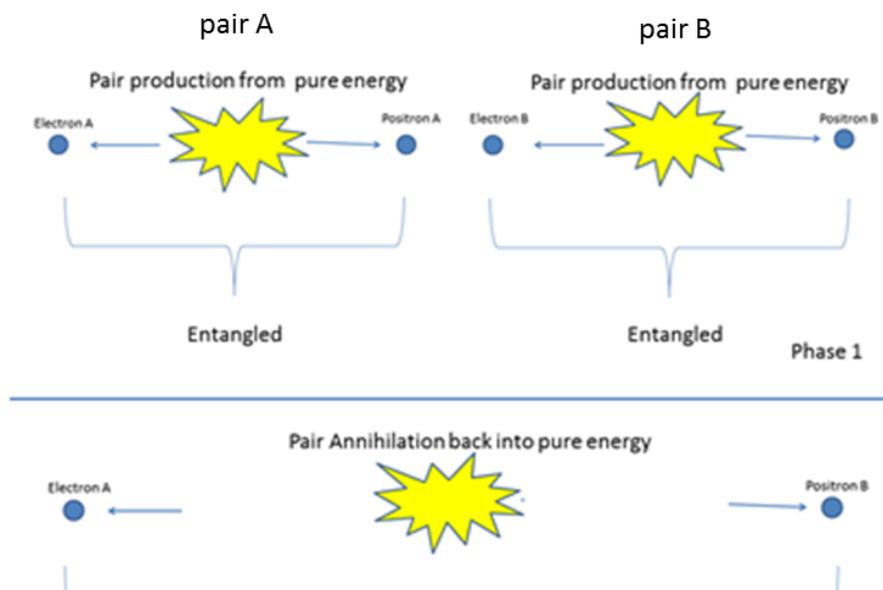


Figure 1: Two separate electron and positron pairs (A and B) are produced from pure photonic energy in an identical procedure.

Phase 1: from conservation consideration, pair A is entangled and pair B is entangled while pair A is not entangled in any way to pair B.

Phase 2: positron A and electron B annihilate each other and from conservation consideration electron A and positron B become immediately entangled between them.

This phenomenon will be referred to in this paper as “**entanglement transfer**” and it can be examined at the LHC. If proven to be correct it is another proof that entanglement is truly a “spooky action at a distance” (EPR paradox) and has nothing to do with hidden variables.

Communication through entanglement transfer

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Key Words: spin; angular momentum; entanglement; matter, antimatter

Based on conservation laws, we can design a system that will generate from photons 2 entangled pairs of electrons and positrons, which we will refer to as up & down.

(Fig. 2)

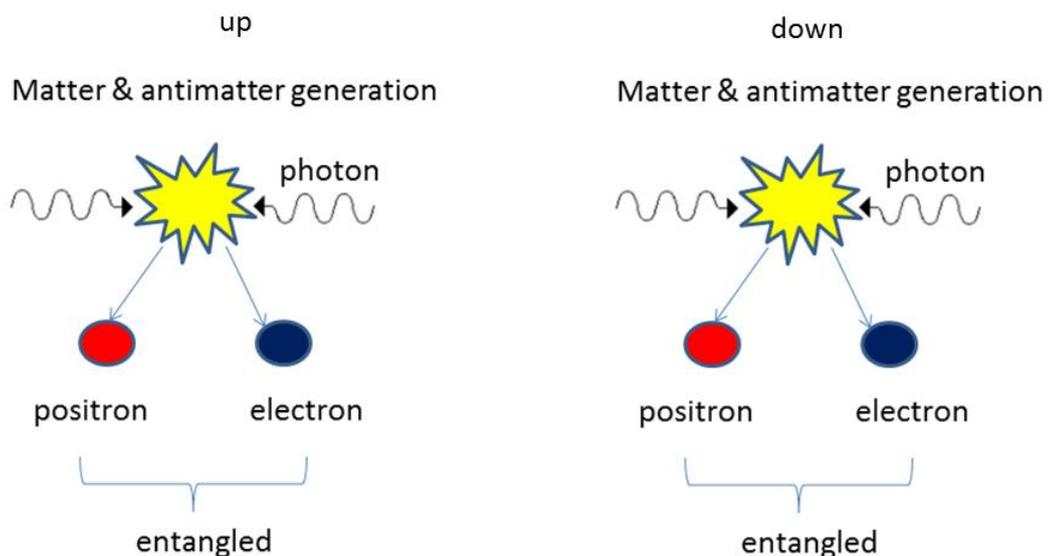


Figure 2: Two entangled pairs (referred to as up& down) of electrons and positrons generated from photons.

Let's assume that there are 2 channels, up and down, that can communicate between Alice and Bob (Fig. 3).channel up is electrically biased in a way that electrons are pulled towards Bob (who is positively charged in the up channel)) and positrons are pulled towards Alice (who is negatively charged in the up channel). Channel down is electrically biased in a way that electrons are pulled towards Alice (who is positively

charged in the down channel)) and positrons are pulled towards Bob ,who is negatively charged in the down channel.

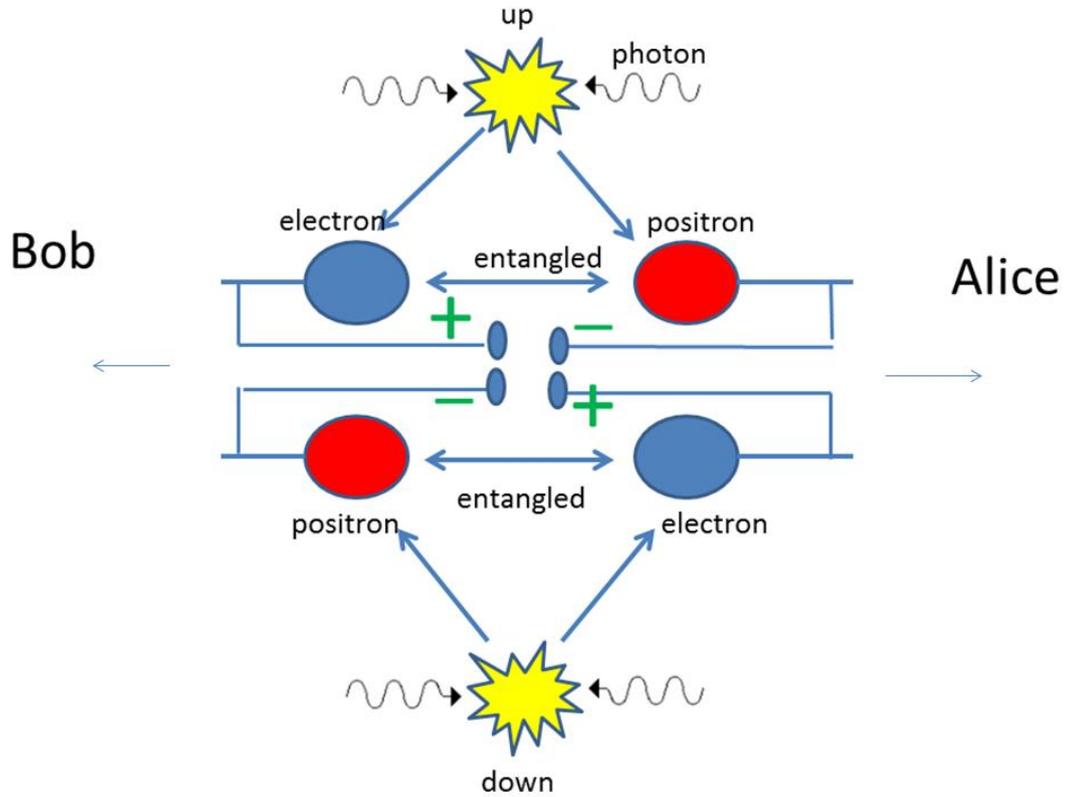


Figure 3: voltage bias is applied in a way that the up channel pulls electrons towards Bob and rejects positrons towards Alice while the down channel pulls positrons toward Bob and rejects electrons toward Alice.

When Bob leads the electron from the up channel into annihilation with the positron from the down channel the entanglement is transferred to the up positron and the down electron at Alice side which become entangled (Fig. 4). When Alice measures these entangled electron-positron pair (e.g. by measuring both spins at a specific direction) she realizes that they are entangled (e.g. their spin is always at an opposite direction) and by that she realizes that Bob is sending her a message (e.g. an entangled spins sequence can mean a “1” logic in Alice and Bob communication protocol)

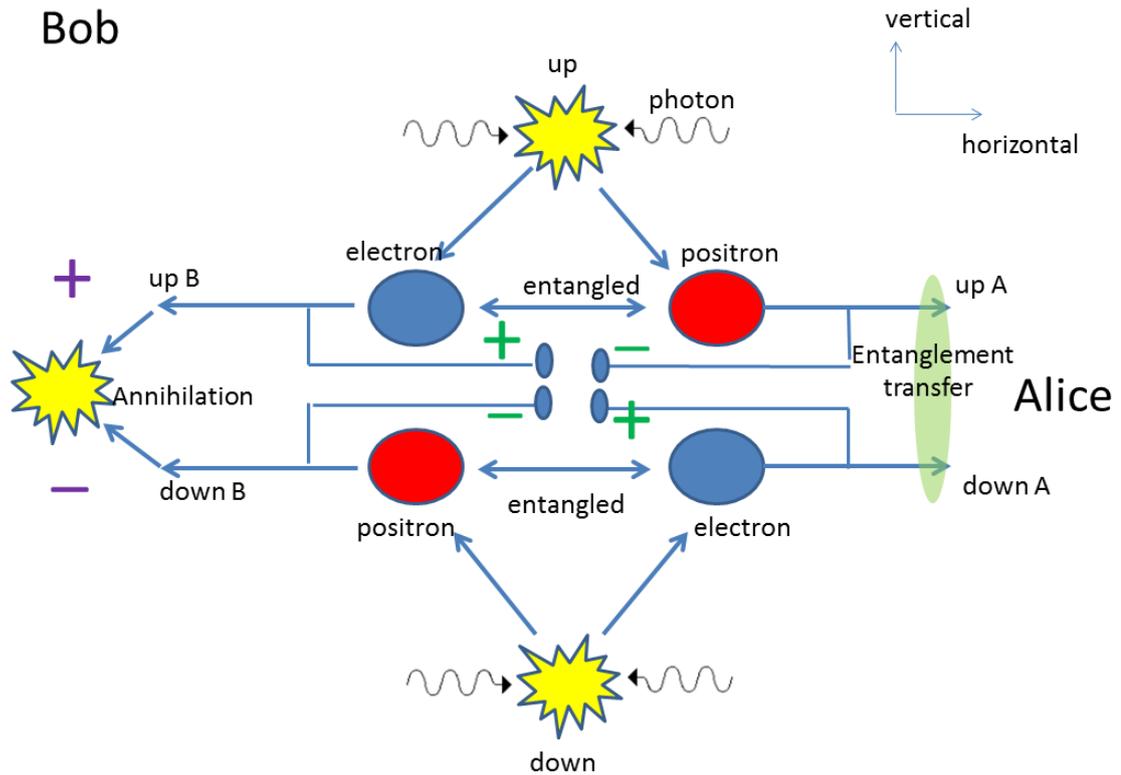


Figure 4: Bob leads the up electrons and down positrons towards each other, into annihilation causing entanglement transfer to the up positrons and down electrons pairs at Alice side. Alice measures this entanglement series of pairs and understands that Bob is signalling her (e.g. a “1” logic).

When Bob leads the electrons in the up channel away from the positrons in the down channel there is no annihilation and the entanglement is not transferred to the up positrons and the down electrons at Alice side (Fig. 5). When Alice measures that these electron-positron pairs (e.g. by measuring both spins at a specific direction to a series of pairs) are not entangled, she realizes that Bob is not sending her a message (e.g. a “0” logic).

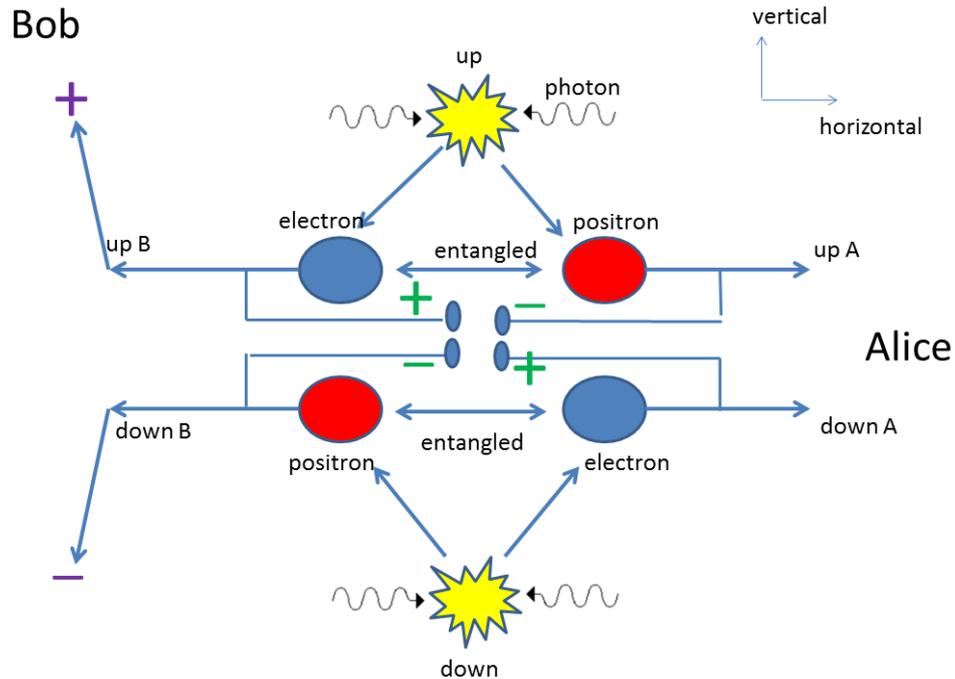
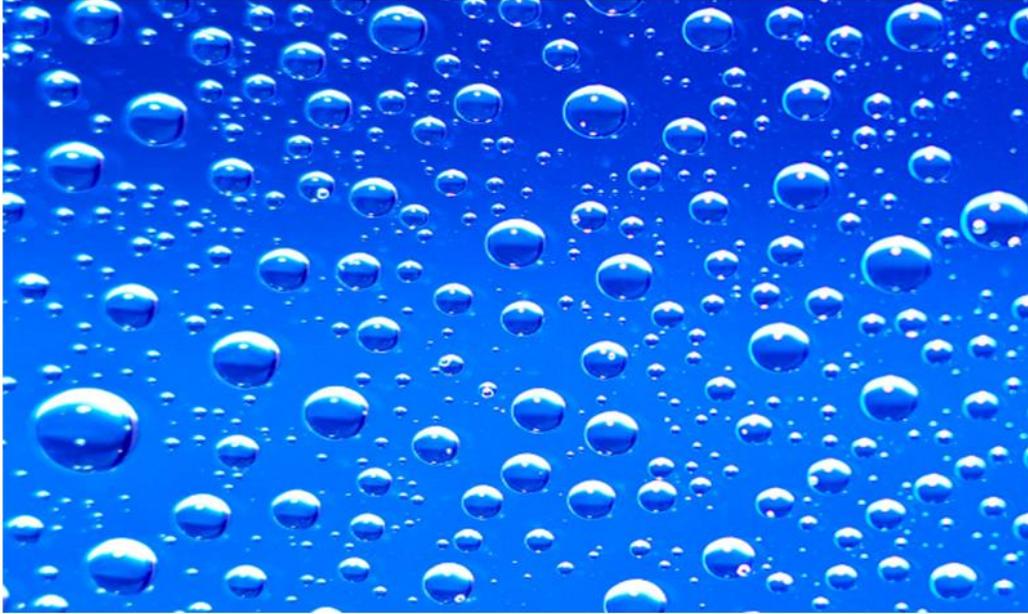


Figure 5: Bob leads the up electrons and down positrons away from each other and prevents the annihilation in his side and by that preventing entanglement transfer to the up positrons and down electrons pairs at Alice side. Alice measures that these pairs at her side are not entangled and she understands that Bob is not signaling to her.

Conclusion

Based on conservation considerations we conclude that for matter and anti-matter pairs (e.g. electron and positron pairs) which were generated from identical photons, in an identical pair generation procedure, it is possible through entanglement transfer to transfer information from Alice to Bob in a non-local (“spooky action at a distance”- Albert Einstein) procedure. The energy on which the information is carried travels at the speed of light and there is no violation of the speed of light limitation. Nevertheless, the information (e.g. “1” or “0” logic bits) carried on this energy can be modulated from Bob to Alice (or the opposite way around) by switching between the entanglement transfer mode (Fig. 4), and the standard mode (Fig. 5).

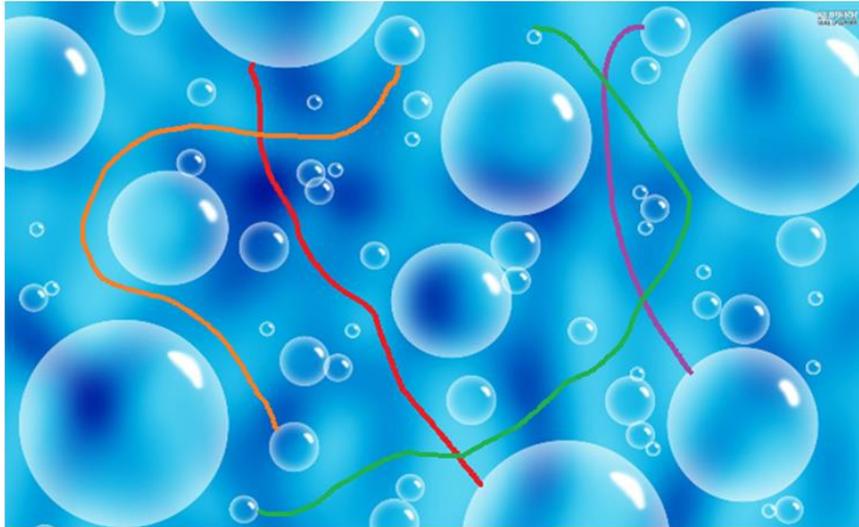
In our previous paper [2], we suggested the “grid dimension” model in which the fabric of space time is quantized to space time “quantized” “local cells in the size of Planck’s length (space) and Planck’s time (time)” “floating” in a non-local “grid like” dimensions (Fig. 6).



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Figure 6: An image of bubbles illustrating the quantized fabric of local space (illustrated by the bubbles) and the grid extra non-local dimensions (illustrated by the void between the bubbles)

Passing energy from one “quantum space cell” to the next (distance of Planck’s length) is a local procedure and it can be done in time discrete sequences of Planck’s time, where in every Planck’s time sequence energy can move to the nearby space cell or stay in place without passing the energy onto the next cell, limiting the local procedure of energy transmitting to the speed of light [2]. Non-local quantum phenomena’s (e.g. entanglement) can be achieved through the non-local, grid dimensions (Fig. 7).



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Figure 7: Non-local phenomena's (e.g. entanglement) can be illustrated through this image of quantized fabric of space(the quantum cells) illustrated by the bubbles image, and through imaginary lines (entanglement) illustrated in the figure as colored lines (orange, red, green and purple) connecting quantum cells in a non-local way through the grid extra dimensions(illustrated as the void between the bubbles) .This non local phenomena through the grid dimensions was referred by Einstein as "spooky action at a distance".

These non-local grid dimensions [2], can explain the non-local phenomena's like entanglement, Schrodinger's wave instantaneous collapse, Pauli's exclusion principle etc.

They can also give us the first insight to mysterious phenomena's like the hidden variables of the quantum probability based laws, dark energy, dark matter, homogeneity of space ,etc.

This non-local behavior of the grid dimensions, seen through entanglement can be exploited for non-local information transmission as detailed in the above paper.

1. References

- [1] Yoav Weinstein¹, Eran Sinbar^{2,*}, and Gabriel Sinbar³ Entanglement
<http://www.slideshare.net/eransinbar1/entanglement-between-matter-and-anti-matter-particles>
- [2] Yoav Weinstein¹, Eran Sinbar^{2,*}, and Gabriel Sinbar³ ,
<http://www.slideshare.net/eransinbar1/quantization-of-photonic-energy-and-photonic-wave-length>

Figure legends:

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