

Direct Quantum Energy Transfer and Superluminal Phenomena

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Abstract

In quantum physics there are some experiments where speed of energy and information transfer seems to be faster than light speed. In order to overcome this puzzle, the option proposed here is that energy and information in these experiments are not carried by photon or other particles. Quantum space itself is the direct medium of energy and information and transfer. This solution gives an original interpretation of the Einstein-Podolski-Rosen experiment and of causality problems for Fermi's two-atom system. In both examples quantum space is a direct medium of energy and information transfer between particles A and B. Time of energy and information transfer between particle A and particle B is zero, speed is infinite.

Key words: time, space, information, energy transfer, light speed infinite speed

Introduction

Information moves between "source" and "detector" that exist in space. With clocks we measure duration of signal motion from source to detector. Time is a measure of information motion, while the maximum speed of information motion is light speed. In cases where information and energy transfer between source and detector is immediate, we consider that quantum space itself is the direct information and energy transfer medium between source and detector.

Einstein-Podolski-Rosen experiment

This experiment shows that two quanta A and B which have been together and then sent in space in opposite directions, "are aware" for each other in an instant moment. When the spin of particle A is unilaterally changed, an astounding experimental result is that the other (B) particle's spin "immediately" flips of its own accord. Furthermore, the means by which the information of the first spin flip is transferred to the second particle (so that it too can flip) is information which is required to travel faster than the speed of light. While the information transfer may not be simultaneous (limitations on

the experimental apparatus prohibit any proof of simultaneity), it nevertheless -- within the time frame of the Planck constant or speeds in excess of the speed of light -- must connect the two particles in some fundamental manner.

Here is considered that in the EPR experiment space is the direct information medium between elementary particles. There is no information signal in form of photon or some other particle traveling between particles A and B. The time of information transfer between particle A and particle B is zero. (1).

Causality problems for Fermi's two-atom system

Space as the "direct information medium" resolves the causality problem of Fermi two atoms system: "Let A and B be two atoms or, more generally, a "source" and a "detector" separated by some distance R. At $t=0$ A is in an excited state, B in its ground state, and no photons are present. A theorem is proved that in contrast to Einstein causality and finite signal velocity the excitation probability of B is nonzero immediately after $t=0$. Implications are discussed (2).

Excitation probability of B is nonzero because the space in which atoms exist is the "direct medium of excitation". Excitation from atom A to atom B is direct and immediate via space and not indirect via particles which move in space from atom A to atom B.

Indirect and Direct Quantum Information and Quantum Energy Transfer

Space can be the direct medium of information (I) and energy (E) transfers between elementary particles. According to quantum gravity, space is made out of quanta of space. Direct quantum information and direct quantum energy transfers run over quanta of space which have the size of Planck. Time (t) of direct quantum information transfer and direct energy transfer between particles is zero; velocity (v) is infinite. The time (t) of indirect quantum information and indirect quantum energy transfers via photons or other particles which move in quantum space is more than zero; velocity (v) is of a light speed.

$$(I),(E) \xrightarrow{\text{transfer}} 10^{-35} \rightarrow t = 0, v = \infty$$

$$(I),(E) \xrightarrow{\text{transfer}} \triangleright 10^{-35} \rightarrow t \triangleright 0, v = c$$

It is considered here that gravity energy transfer between elementary particles and massive bodies through quanta of space is direct and immediate. Gravity is generated by the quantum structure of space. The quantum structure of space defines the curvature of space and so the gravity force. Time of energy transfer by gravity is zero.

Superluminal Phenomena

According to understanding here physical phenomena where speed of information and energy transfer is higher than light speed exist.

Experiment from which they conclude that an electron can tunnel through the potential barrier of an He atom in practically no time was carried out recently (3). It is considered here that electron can be understood as an energy transfer via quanta of space and so its speed is infinite.

Conclusions

Quantum information transfer and quantum energy transfer via particles have a light speed. Quantum information transfer and quantum energy transfer via quantum space are immediate.

References:

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