Duality of Time from Quantum Entanglement

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Abstract: Experimentalists used an entangled state of two photons to show that time is going in different way for internal and external observers. Here, within the Scale-Symmetric Theory (SST), we show that such scenario concerns the elliptical states of electron in atoms. There are two different entangled circular states of an elliptical state. The jumps of entanglon (entanglons are responsible for quantum entanglement) between them cause that global energy is static whereas an internal observer associated with one of two entangled circular states (the clock) sees evolution of the other circular state. It is the duality of time from quantum entanglement. Similar mechanism concerns two mass states of proton and of neutron but there is exchanged not an entanglon but electric charge between the very dense gluon fields in nucleons. The exchanges lead to the mean fractional charges of such gluon fields.

Here [1], we can read that “experimentalists used an entangled state of the polarization of two photons, one of which is used as a clock to gauge the evolution of the second: an “internal” observer that becomes correlated with the clock photon sees the other system evolve, while an “external” observer that only observes global properties of the two photons can prove it is static.”

We can explain it using the mechanism that leads to the Pauli Exclusion Principle [2]. Such mechanism is described within the Scale-Symmetric Theory (SST) [3]. Assume that an elliptical state of an electron in an atom observed by an external observer is globally static. The SST shows that such static state is in reality a state of two entangled circular states. If one of the two circular states represents a clock to gauge the evolution of the second circular state then due to the exchanged non-gravitating superluminal entanglon responsible for quantum entanglement (it carries the unitary spin), the clock sees (so the internal observer sees as well) the other system evolve (the clock sees the two different circular states of the other system and the frequency of the jumps between them). It is the duality of time from quantum entanglement.

Similar mechanism acts inside protons and neutrons [3A]. In both proton and neutron there are two mass states but there is exchanged not an entanglon between the two states – there is exchanged electric charge between the very dense gluon fields in nucleons. Such exchanges lead to the two different states of nucleons. Moreover, the exchanges lead to the mean

fractional charges of such gluon fields. We showed that global rest mass measured by external observer is static whereas an internal observer sees evolution of the other mass state.

References

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