Review of: "Entangled Simultaneity: Testing Lorentz and Light-Speed Invariance with Quantum and Classical Entanglement"

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Potential competing interests: No potential competing interests to declare.

Accept after minor modifications

This manuscript introduces a procedure for the synchronization of distant clocks using the so-called "classical entanglement" preset in the physical system, which can potentially avoid issues due to the asymmetry of two-way delay. The manuscript is well-written, though some aspects of it are ambiguous and unrealistic. I would suggest the authors address the following concerns and comments in a revised version of their manuscript.

1) Action at a distance was instantaneous before the advent of Einstein's special theory of relativity. This gets amended consequent to the upper limit of information passage, i.e., the velocity of light. The simultaneity that occurs in quantum entanglement too is subject to the frame of reference (FOR) from which the observation is taking place (i.e., when the observer is in a moving frame or not). Hence, the simultaneity present here is certainly FOR dependent, even though the authors base their observation on the Sagnac effect, which claims a time difference for light photons to travel a round trip.

2) The authors in the Introduction state that "the one-way speed from A to B can be different from the return speed from B to A." However, this statement is taken for granted, and this claim is not substantiated as to why the return time is not coinciding with the forward travel from A to B of light?

3) The synchronization of clocks in non-inertial frames would be a topic of practical significance, as the frames fixed on Earth would be non-inertial. The authors need to comment on this aspect in the manuscript.

4) I would like the authors to explain how the experimental verification of synchronization of

clocks using quantum entanglement is envisaged by them, since this is the critical challenge one faces when the synchronization is really implemented.

5) The events of synchronization occurring simultaneously can be interpreted as if the interval between two events is spacelike, and hence there exists a reference system in which the two events occur simultaneously. However, the precondition for this process to take place is that the interval between two events is an imaginary number. How do the authors deal with such a paradoxical situation in their treatment of simultaneity?