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.

Section 1, equation (1), develops the Lorentz transform ( ). For the use of the Lorentz relationship in quantum measurements, see: Relative Measurement Theory, available at: https://www.sciencedirect.com/science/article/pii/S0263224117306887. This explains how (1) is a time calibration (metrology view).

In Section 1, it would have been helpful to this reviewer to simply explain the Sagnac effect.

"To achieve quantum clock synchronization, in general, a quantum entangled state is sent from a node to another node. For example, Charlie prepares a singlet state that is sent to Alice at A and Bob at B. There is an unknown relative phase in the singlet of Alice and Bob, reflecting the two different basis conventions. Moreover, in sending the qubit from Alice to Bob, the different phase conventions and time offset have to be related to the probability of an error."

The quote above first identifies "a quantum entangled state." Then it identifies "a singlet state." Then it identifies "a qubit." This is not helpful to this reviewer.

In Section 3, the word "mimics" is applied, comparing the fixed phase oscillation of two rotating points on one rod with the "unknown relative phase" described in an earlier paragraph (shown above). This reviewer, who does not claim to understand what mimic means in physics, does not see a similarity between the fixed phase of two marks on one rod and the independent phase of two spinning particles.

"This natural, ”classically entangled”, simultaneity can be used to," makes little sense to this reviewer. The description developed describes a fixed phase relationship, which is NOT what is described by quantum entanglement. This reviewer does not know what ”classically entangled” means. A reference (describing the physical effect of quantum entanglement) that may be helpful to the authors is: N. D. Mermin, Bringing home the atomic world: Quantum mysteries for anybody, American Journal of Physics, Vol 49 (10), October, 1981.

In Section 4, the authors show their considerable background in time measurement systems. Applying that background to the experimental time measurement of remote quantum entangled particle spins could develop another paper.