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Peer Review

Review of: "Local Everettianism and Asymmetric Relative Statehood"

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The author develops that Everett's "Relative State" conception is not a resolution of the quantum mechanics (QM) measurement problems which were first clearly identified in the well-known Einstein-Podolsky-Rosen paper (referenced by the author). This has been stated before by J. A. Wheeler* (not referenced by the author). Wheeler describes Everett's "Relative State" conception as "completely different" from the QM conception of an external observer, but does not go into details.

Although others (referenced by the author) find the "Relative State" formulation does offer some resolution of quantum mechanics problems, the author's development that the "Relative State" formulation does not offer such resolution is not the first or the clearest. Both J. S. Bell (referenced by the author) and N. D. Mermin** (not referenced by the author) present the QM measurement problems in a way that a "Relative State" formulation cannot resolve. The Mermin paper quantifies the unique aspect of the entangled spin experiments which the author describes less clearly.

This reviewer finds the author's conclusion valid, but does not find that this conclusion adds to a better understanding of the QM measurement problems. The fact that the author refutes other authors who consider Everett's "Relative State" formulation valid is one more indication of their misunderstanding of the QM measurement problems, not an advancement of the science.

In metrology, all physical measurement results must be relative to be comparable, not relative to another local measurement state as Everett proposes, but relative to the state of a non-local unit standard as defined by The International System of Units (SI) (https://www.bipm.org/en/measurement-units). All comparable (i.e., not probabilistic) measurements are relative to a reference or unit standard, which is what QM has confusingly considered an external observer. This metrology conception of relative measurement, when analyzed (https://www.qeios.com/read/SH5D0Z), appears to resolve the QM measurement problems.

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*J. A. Wheeler, Assessment of Everett's "Relative State" Formulation of Quantum Theory, Reviews of Modern Physics, Vol 29, No. 3, 463-465, July, 1957.

**N. D. Mermin, Bringing home the atomic world: Quantum mysteries for anybody, American Journal of Physics, Vol 49 (10), October, 1981. Richard Feynman described this paper as, "...one of the most beautiful papers in physics."

Declarations

Potential competing interests: No potential competing interests to declare.