# Review of: "On the Bell Experiment and Quantum Foundation"

Ken Krechmer[1]

1 University of Colorado at Boulder

Potential competing interests: No potential competing interests to declare.

The author wisely notes: “However, the main problems of quantum mechanics are not simply related to mathematics, but to what mathematics describes.” However, the author's development addresses only a part of the problems sometimes termed measurement problems:

The author's concept of an "accessible conceptual variable" seems close to Bell's non-local structure.

The author's development does not address the entropy increase beyond expectations noted in the Compton-Simon experiments.

The elephant in the quantum mechanics (QM) measurement room is non-commuting, that is in QM xp does not always equal px. This violation of arithmetic, not addressed in this article, is too basic for this reviewer (who well recognizes the great success of QM) to accept.

Using different developments others (e.g., von Neumann) have entertained the possibility that the perplexing differences between quantum (local realism) and classical mechanics (Bell's non-local structure) are related to the observer. So while the author's conception is valid and the development is new, the result is similar. None of these development have addressed all the issues.

The author describes that each eigenspace (a measuring apparatus interval) is unity in each dimension. The issues this raises are:

1. A measuring apparatus interval is always calibrated to the standard and will be uncertain (limited by the quantization of calibration) relative to the standard (rarely unity).

2.Each measuring apparatus interval on a physical scale may be different from the others. The random differences (without noise and distortion) of each interval are responsible for a Gaussian distribution of physical measurement results.

3. A unity standard would have no effect on a measurement result. However, a measurement result requires a characteristic common element (one is a common element of everything) otherwise only comparisons are possible (as in QM).

4. Without reference to a standard even a measurement result property (e.g., distance, momentum, time, spin) is a guess.

Relative measurement theory (RMT, 2018, https://www.sciencedirect.com/science/article/pii/S0263224117306887 ) applying a metrology perspective, develops a resolution of all the issues, identifying a comparable measurement result as a numerical value (in QM an eigenvalue) and a unit (in QM an eigenvector). This pair of numerical value and unit is termed a quantity following Maxwell's model. In RMT the unit is represented by a measuring apparatus interval which is calibrated (an entropy increase) to a standard (the accessible conceptual variable or Bell's non-local structure).

When a measurement result is a quantity, non-commuting no longer appears, only the effects of unit quantization which in metrology may be termed precision and in QM are termed uncertainty.