Review of: "On Einstein-Bohr Debate and Bell's Theorem"

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The author enters very poorly armed a famous dispute between famous people.

The impossibility of absolute measurement accuracy is too obvious, and it is naive to think that people were not aware of it before. Moreover, it applies equally to both the classical and quantum world, this is not what makes quantum theory special. Even the speed of light cannot be measured with absolute precision and still we admit that it is a universal constant, not a random variable.

The discussion of Heisenberg uncertainty is downright wrong. The author claims that "The equality holds if and only if the commutator vanish identically". Neither the "if", nor the "only if" holds. Take as operators the x and y coordinates, which commute, and as a wave function one that has nonzero extension in both directions. Conversely, any Gaussian wave function brings equality in the Heisenberg inequality for position and momentum. (The squeezed states in photonics are defined precisely as those which obey equality).

Further on the author argues that anyhow one cannot measure simultaneously the standard deviations of noncommuting operators, since "the same single quantum object can at most be measured only once". Nielsen and Chuang ("Quantum Computation and Quantum Information") refute such 'common misconception' in Box 2.4 of their book. I am amazed that the author discusses probabilities but admits that we have only a single event. (It is like in the dialogue 'You are a boy but, statistically, with 0.5 probability you could have been a girl/ You are wrong, that would not be me, that would have been my sister.')

This example show that the author misses an important point, namely that for any quantum state one can compute the two standard deviations and show that they obey the Heisenberg inequality. No measurement is needed, but it still has practical consequences, like the impossibility to have the harmonic oscillator at rest at the potential minimum.

More generally, the author seems to ignore that the dispute in question is first and foremost about the inner consistency of the quantum theory, and measurements are meant only to decide between predictions of different theoretical pictures. The classical result of Bell is lesser that 2 and the quantum prediction is larger by a finite amount ($2\sqrt{2}$, i.e. approx. 2.83) therefore there is room even for a finitely accurate experiment to give a decisive answer.

The paper is exceedingly verbose and full of lengthy presentations of trivial facts. Formulas are well-known or obvious. While discussing the impossibility of perfect, point-like measurements one is reminded that a neighborhood of a point contains a ball of small radius around the point. A more blatant overshooting is invoking Kolmogorov probability axioms and the law of large numbers (and the strong one at that) to prove the obvious and intuitive fact that in a continuous distribution a point has zero probability. Plus a short lecture on Hilbert spaces.

In conclusion, the claims are big, the problem even bigger and the arguments not up to the task.