

Review of: "On Quantum Superposition"

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The paper is well written and can be a plausible reply to the standard interpretation of quantum mechanics. Yet the paper lacks some points. First, the debate on the issues raised in the paper is still ongoing, and the paper only considered one line of such debate. Second, the paper is concerned with a type of experiments deduced from bell inequality, namely Aspect's experiments, nonetheless, the new discoveries in quantum optics, especially down-converters, allowed clusters of experiments that can act on a single particle in two kinds of measurements within the same experimental setup – see Kwiat *et al.* (Even before down-converters, Ghose *et al.* (1991) suggested a way out of single experiment flaw). (for an overview and discussion of these experiments please consult Shomar 2020). Third, it is not necessary to assume that the mathematical formula is an expression of reality, there might be other interpretations of that. Fourth, Although the standard interpretation of quantum mechanics is usually associated with Bohr (hence the name of Copenhagen interpretation), many insisted that his position is distinct from that of the standard interpretation (Shomar 2008, 2013 for example). Bohr position on complementarity, and his reply on the EPR, ought to be discussed.

- Ghose, P., Home, D., & Agarwal, G. (1991). An experiment to throw more light on light. *Physics Letters A*, 153(9), 403–406.
- Ghose, P., Home, D., & Agarwal, G. (1992). An “Experiment to throw more light on light”: Implications. *Physics Letters A*, 168(2), 95–99.
- Ghose, P., & Sinha Roy, M. (1991). Confronting the complementarity principle in an interference experiment. *Physics Letters A*, 161(1), 5–8.
- Home, D. (2013). Bohr's philosophy of wave–particle complementarity. *Resonance*, pp. 905–916, <http://www.ias.ac.in/article/fulltext/reso/018/10/0905-0916>. October, 2013.
- Home, D., & Kalayerou, P. (1989). A new twist to Einstein's two-slit experiment: Complementarity vis-a-vis the causal interpretation. *Journal of Physics A: Mathematical and General*, 22, 3253–3266.
- Kwiat, P., Steinberg, A., & Chiao, R. (1992). Observation of a quantum eraser: A revival of coherence in a two-photon interference experiment. *Physical Review A*, 45(11), 7729–7739.
- Kwiat, P., Steinberg, A., & Chiao, R. (1993a). High-visibility interference in a Bell-inequality experiment for energy and time. *Physical Review A*, 47(4), R2472–R2475.
- Kwiat, P., Steinberg, A., Chiao, R., Eberhard, P., & Petrof, M. (1993b). High-efficiency single-photon detectors. *Physical Review A*, 48(2), 867–870.
- Kwiat, P., Vreka, W., Hong, C., Nerthel, H., & Chiao, R. (1990). Correlated two-photon interference in a dual-beam Michelson interferometer. *Physical Review A*, 41(5), 2910–2913

- Shomar, T. (2008). Bohr as a phenomenological realist. *Journal for General Philosophy of Science*, 39, 321–349.
- Shomar, T. (2013). *Phenomenological realism, Superconductivity and Quantum mechanics*. SaarBrücken: Lambert Academic Publication.
- Shomar, T. (2020), Complementarity Revisited, *Foundations of Science* (2020) 25:401–424.