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The reference frame interpretation

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This talk is around the discussion of the nature of the quantum state: is the quantum state an ontological description of the system or is it just an epistemological tool for prediction?

In this talk I will make a revision of the PBR theorem; through this I will prove that in order to conclude that a certain quantum state is ontological, by carrying out the demonstration of the PBR theorem[1], the precise quantum system whose state is concluded to be ontological must have undergone a measurement. Then, it is shown that what PBR demonstrate is that systems which have been measured are described by states which are ontological. All this implies that through the PBR theorem one cannot conclude the ontology of a quantum state which describes a system that has not been measured.

With this result I will construct an interpretation of the theory that is inspired by Bohr's complementarity principle, which is what we call *\emph{the reference frame interpretation}* of Quantum Mechanics.

[1] Pusey, M. F., Barrett, J., Rudolph, T.: On the reality of the quantum state. Nature Physics. 8, 475 (2012)

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