The paraconsistent logic of quantum superpositions. (English) Zbl 1272.81014

Summary: Physical superpositions exist both in classical and in quantum physics. However, what is exactly meant by ‘superposition’ in each case is extremely different. In this paper we discuss some of the multiple interpretations which exist in the literature regarding superpositions in quantum mechanics. We argue that all these interpretations have something in common: they all attempt to avoid ‘contradiction’. We argue in this paper, in favor of the importance of developing a new interpretation of superpositions which takes into account contradiction, as a key element of the formal structure of the theory, “right from the start”. In order to show the feasibility of our interpretational project we present an outline of a paraconsistent approach to quantum superpositions which attempts to account for the contradictory properties present in general within quantum superpositions. This approach must not be understood as a closed formal and conceptual scheme but rather as a first step towards a different type of understanding regarding quantum superpositions.

MSC:
81P05 General and philosophical questions in quantum theory
81P10 Logical foundations of quantum mechanics; quantum logic (quantum-theoretic aspects)
81P40 Quantum coherence, entanglement, quantum correlations

Keywords:
quantum superposition; para-consistent logic; interpretation of quantum mechanics

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References:

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