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The role of von Neumann and Lüders postulates in the Einstein, Podolsky, and Rosen considerations: comparing measurements with degenerate and nondegenerate spectra. (English)

Zbl 1152.81510

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Summary: We show that the projection postulate plays a crucial role in the discussion on the so-called quantum nonlocality, in particular, in the Einstein, Podolsky, and Rosen argument. We stress that the original von Neumann projection postulate was crucially modified by extending it to observables with degenerate spectra (the Lüders postulate) and we show that this modification is highly questionable from a physical point of view and is the real source of quantum nonlocality. The use of the original von Neumann postulate eliminates this problem: instead of an action at a distance nonlocality we obtain a classical measurement nonlocality, which is related to the synchronization of two measurements (on the two parts of a composite system). ©2019 American Institute of Physics

MSC:

81P15 Quantum measurement theory, state operations, state preparations

81P05 General and philosophical questions in quantum theory

Cited in **2** Documents

Full Text: [DOI](#)

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