Entanglement, Upper Probabilities and Decoherence in Quantum Mechanics

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Abstract

Computation of decay time for entangled quantum systems is an important aspect of decoherence theories. Here we explore this topic from the standpoint of computing the decay time to the existence of a joint probability distribution of the entangled particles – atoms, in our case. We also analyze the problem from the viewpoint of the decay of an improper upper probability distribution, for the entangled particles and its continuous decay into a proper probability distribution. A standard quantum decoherence model and the upper-probability model have, it turns out, the same expected decay time for a familiar example of a system with a Bell state.

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