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Entanglement degradation in a bipartite system with a finite lifetime observer

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A bipartite system composed by an inertial observer (Alice) and an accelerated observer (Charlie) has been used in previous studies to show a connection between entanglement degradation and the Unruh effect. The degradation in entanglement between two modes of a non-interacting scalar field is attributed to the relative acceleration between the observers. In this work, we analyze the influence of an observer finite lifetime in the entanglement of a bipartite system where the other observer is inertial. The finite lifetime observer is restricted to move in a causal diamond, which helps establish a connection with the constantly accelerated observer case. The system is initially in a maximally entangled state, observed from the perspective of inertial observers, and it becomes less entangled as the lifetime shortens. We argue that this effect is due to the presence of the causal horizons.

Academic year

5th year and/or beyond

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