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【555】Unruh effect for detectors in superposition of accelerations

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We consider the Unruh effect for a pointlike multilevel particle detector coupled to a massless real scalar field and moving in a quantum superposition of accelerated trajectories. The state of the detector excitations is, in general, not a mere mixture of the thermal spectrum characteristics of the Unruh effect for each trajectory with well-defined acceleration separately. For certain trajectories and excitations, and upon the measurement of the trajectory state, the state of the detector features in addition off-diagonal terms. The off-diagonal terms of these "superpositions of thermal states" are related to the distinguishability of the different possible states in which the field is left after its interaction with the detector.

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