Controlling the collapse and revival dynamics of a qubit in quantized anharmonic radiation fields

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The Jaynes-Cummings model is well known as a fair approximation to the interaction of two-level atoms with single modes of quantum radiation fields. In this talk we analyze the case when the field is represented by a quantum anharmonic oscillator. The annihilation and creation field operators depend on a distortion parameter and satisfy a modified version of the Heisenberg algebra. Our model is sensitive to the radiation field statistics. We also show that the quantum revival and collapse of the atomic inversion is regulated by the distortion parameter of the radiation field.

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