Abstract Submitted
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Generation of macroscopic Schroedinger's cat states in qubit-oscillator systems[1] JIN-FENG HUANG, Department of Physics, Hunan Normal University, Changsha 410081, China, JIE-QIAO LIAO, LIN TIAN, School of Natural Sciences, University of California, Merced, California 95343 — We study a scheme to generate macroscopic Schroedingers cat states in a quantum oscillator (electromagnetic field or mechanical resonator) coupled to a quantum bit (two-level system) via a conditional displacement mechanism. By driving the qubit monochromatically, the oscillation of the qubit state modifies the effective frequency of the driving force acting on the oscillator, and a resonant or near resonant driving on the oscillator can be achieved. The displacement of the oscillator is then significantly enhanced due to the small detuning of the driving force and can exceed that of the zero-point fluctuation. This effect can be used to prepare quantum superpositions of macroscopically distinct coherent states in the oscillator. We present detailed studies on this state generation scheme in both closed and open system cases. This approach can be implemented in various experimenta

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