

Abstract Submitted
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Qubit-oscillator systems in the ultrastrong-coupling regime and their potential for preparing nonclassical states¹ FRANCO NORI, SAHEL ASHHAB, RIKEN and University of Michigan — We consider a system composed of a two-level system (i.e. a qubit) and a harmonic oscillator in the ultrastrong-coupling regime, where the coupling strength is comparable to the qubit and oscillator energy scales. We explore the possibility of preparing nonclassical states in this system, especially in the ground state of the combined system. The nonclassical states that we consider include squeezed states, Schrodinger-cat states and entangled states. We also analyze the nature of the change in the ground state as the coupling strength is increased, going from a separable ground state in the absence of coupling to a highly entangled ground state in the case of very strong coupling. Reference: S. Ashhab and F. Nori, Phys. Rev. A 81, 042311 (2010).

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