

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Generation of non-classical states of a harmonic oscillator by measurement using a two-level system MEHMET CANTURK, Institute for Quantum Computing, University of Waterloo, ADRIAN LUPASCU, Institute for Quantum Computing, Department of Physics and Astronomy, and Waterloo Institute for Nanotechnology, University of Waterloo, CA — Generation of non-classical states of a harmonic oscillator is a topic of considerable fundamental interest and has practical implications to the development of sensors. We discuss the indirect measurement of a harmonic oscillator using a two-level system, or qubit. We analyze in detail a protocol which leads to the preparation of states with a reduced uncertainty in one of the quadratures. We also analyze relevant imperfections in this protocol, including oscillator energy relaxation, qubit dephasing, qubit measurement errors, and finite temperatures. We discuss the prospects for practical implementation of this protocol with mechanical or electrical resonators measured using superconducting qubits.

Mehmet Canturk
Institute for Quantum Computing, University of Waterloo

Date submitted: 12 Nov 2016

Electronic form version 1.4