

Abstract Submitted
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Quantum measurement of a Cooper-Pair Box using a nanomechanical resonator AKSHAY NAIK, University of Maryland and Laboratory for Physical Sciences, College Park, MD , KEITH SCHWAB, Laboratory for Physical Sciences, College Park, MD — It has been shown by Irish and Schwab that the resonant frequency of a nanomechanical resonator depends on the quantum state of the Cooper-Pair box (CPB) coupled to it. In addition, the energy splitting of the CPB is shifted as a result of the interaction with the resonator. We explore the possibility of using the nanomechanical resonator to detect the state of a CPB at degeneracy. We also discuss the possibility of making quantum nondemolition measurements of Fock states of the nanomechanical resonator by probing the energy levels of the CPB. We will describe our experimental progress where we are currently working with a 10 MHz resonator which is capacitively coupled to the CPB. The resonator is read out using our newly developed impedance matched, capacitive technique.

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