Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Characterizing an itinerant microwave Fock state compatible with transfer to a macroscopic mechanical oscillator[1] L.R. SLETTEN, A.P. REED, XIZHENG MA, JILA, University of Colorado, Boulder, Colorado, L.D. BURKHART, M. REAGOR, W. PFAFF, R.J. SCHEOLKOPF, Department of Physics and Applied Physics, Yale University, New Haven, Connecticut, K.W. LEHNERT, JILA and National Institute of Standards and Technology, Boulder, Colorado — Transferring propagating single-photon signals generated by a qubit to a mechanical oscillator offers a way to prepare non-classical motional states of a macroscopic object. In this concept, a highly coherent transmon qubit in a cavity is used to create single itinerant microwave photons. These photons can then be directed towards a tunable electromechanical circuit where they can be converted into single phonons. In this talk, we present measurements of itinerant single photons engineered to realize this concept. In particular, we: characterize their quantum state tomographically, demonstrate that they have sufficiently narrow bandwidth for capture by an electromechanical circuit, and measure the efficiency with which they travel between microwave cavities.

[1]This work was supported by the Gordon and Betty Moore Foundation

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Date submitted: 06 Nov 2015 Electronic form version 1.4