Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Noise and correlations in a microwave-mechanical-optical transducer\textsuperscript{1} ANDREW P. HIGGINBOTHAM, PETER S. BURNS, ROBERT W. PETERSON, MAXWELL D. URMEY, NIR S. KAMPEL, TIMOTHY MENKE, JILA, NIST and CU Boulder, KATARINA CICAK, RAYMOND W. SIMMONDS, NIST, Boulder, CINDY A. REGAL, KONRAD W. LEHNERT, JILA, NIST and CU Boulder — Viewed as resources for quantum information processing, microwave and optical fields offer complementary strengths. We simultaneously couple one mode of a micromechanical oscillator to a resonant microwave circuit and a high-finesse optical cavity. In previous work, this system was operated as a classical converter between microwave and optical signals at 4 K, operating with 10% efficiency and 1500 photons of added noise (1). To improve noise performance, we now operate the converter at 0.1 K. We have observed order-of-magnitude improvement in noise performance, and quantified effects from undesired interactions between the laser and superconducting circuit. Correlations between the microwave and optical fields have also been investigated, serving as a precursor to upcoming quantum operation.


\textsuperscript{1}We acknowledge support from AFOSR MURI grant FA9550-15-1-0015 and PFC National Science Foundation grant 1125844.

Andrew P. Higginbotham
JILA, NIST and CU Boulder

Date submitted: 11 Nov 2016
Electronic form version 1.4