

Abstract Submitted
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Towards the strong dispersive coupling of a superconducting qubit to a mechanical oscillator.¹ JEREMIE VIENNOT, XIZHENG MA, WILL KINDEL, KONRAD LEHNERT, JILA and Department of Physics, University of Colorado, Boulder, Colorado 80309, USA — The preparation and readout of arbitrary non-classical states of motion is an important goal in the field of quantum cavity optomechanics or electromechanics. One strategy is to couple a mechanical system directly to a strong non-linearity such as a two level system, or qubit. I will present our recent progress on the realization of a hybrid system consisting of an aluminum drumhead and a Cooper pair box. We use a DC-biased capacitive coupling scheme in which coupling strength scales with DC voltage. The maximum DC voltage that can be applied is limited by an electrostatic instability, which we mitigate using a capacitance bridge geometry. This system should be able to reach a regime where the mechanical oscillator can be cooled and prepared in a non-classical state using qubit control.

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