

Abstract Submitted
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A Qubit-Coupled Nanomechanical Resonator Integrated with a Superconducting CPW Cavity¹ YU HAO, FRANCISCO ROUXINOL, Syracuse University, SEUNG-BO SHIM, Korean Research Institute for Science and Standards, MATT LAHAYE, Syracuse University — In this work we discuss some of our first results integrating a qubit-coupled nanomechanical resonator with a superconducting transmission line resonator. This hybrid circuit QED system is composed of a capacitively-coupled superconducting charge-type qubit and UHF-range flexural nanoresonator, which are both embedded within a superconducting niobium coplanar waveguide (CPW) cavity. Phase-sensitive transmission measurements of the CPW cavity are used to spectroscopically probe the qubit-coupled nanoresonator via the qubit-state-dependent dispersive shift of the cavity frequency. We will discuss the design and measurement of the latest generation of these devices and the prospects for using this system to read-out the number-states statistics of a nanomechanical resonator at low thermal occupancy.

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Yu Hao
Syracuse University

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