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Investigations of a transmon-coupled nanoresonator in a CPW cavity. YU HAO, Syracuse University, FRANCISCO ROXINAL, University of Campinas, MATT LAHAYE, Syracuse University — In this work, we describe our progress developing a qubit-coupled nanomechanical resonator(nmr), which has potential both for fundamental studies in quantum measurement and quantum thermodynamics and applications in quantum information. The hybrid system is composed of a superconducting charge-type transmon qubit and a ultra-high-frequency flexural nmr; both are embedded in, and measured through, a superconducting coplanar-wave-guide(CPW) resonator. Transmission measurements of the CPW cavity allow us to probe the state of transmon as it interacts resonantly with the NMR. In the talk, we'll present the latest measurements of this device at low NMR thermal occupation factors and discuss future prospects for developing this system for more advanced quantum measurements.

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