

Abstract Submitted
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Microwave electromechanics on suspended piezoelectric membranes G. PEAIRS, K. J. SATZINGER, A. VAINSENER, UC Santa Barbara, A. N. CLELAND, University of Chicago — Nanomechanical resonators with microwave frequency resonances have been operated in the quantum regime, and are attractive for hybrid electro- and opto-mechanical schemes. We characterize a class of electromechanical devices using propagating phonons in two dimensions, operating at frequencies compatible with both superconducting qubits and optomechanical resonators. We use interdigitated transducers on suspended aluminum nitride membranes to launch and detect traveling acoustic waves. We demonstrate resonances localized to the transducers, as well as transmission across membranes and extended resonances in the acoustic cavities formed by the edges of the suspended membranes. We compare these measurements to analytic as well as finite-element models to determine key parameters, including the electromechanical coupling and propagation loss.

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