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Noise and Back-action in Nanomechanical Resonators OLIVIER BUU, MATTHEW LAHAYE, BENEDETTA CAMAROTA, KEITH SCHWAB, Laboratory for Physical Sciences — We have recently demonstrated that a superconducting Single Electron Transistors (SSET) capacitively coupled to a nanomechanical resonator, can be used as a nearly-quantum limited position detector. The ultimate sensitivity of this scheme is limited both by forward-coupled charge fluctuations on the SET island and back-acting electrostatic potential fluctuations which drive the resonator. In this talk, we will present our recent measurements of SET back-action on nano-resonators. In particular, we will discuss the back-coupled power, damping, and frequency of the resonance as a function of the coupling between the SET and the resonator and compare these results to theoretical predictions.

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