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Nonequilibrium electromechanical noise in a nanomechanical resonator PATRICK TRUITT, JARED HERTZBERG, University of Maryland, KEITH SCHWAB, Cornell University — Current carrying electrons passing through a diffusive conductor can undergo elastic collisions with defects or surface boundaries and thus impart momentum to the lattice. At sufficiently low temperatures, where the electron-phonon scattering length is longer than the mean free path, this electromechanical noise can be driven out of equilibrium with the conductor's thermal noise (Joule heating). The resulting force from elastic collisions on a doubly-clamped beam was predicted by Shytov et al [1]. We will discuss our low temperature measurements of a gold-coated, radio-frequency nanomechanical resonator. We current bias the conducting layer and monitor the position of the resonator with an RF-SET. From mechanical noise thermometry, we then compare the observed electromechanical noise force with the theory.

[1] A.V. Shytov, L.S. Levitov, and C.W.J. Beenakker, Phys. Rev. Lett. **88**, 228303 (2002)

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