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Dissipation in metallic nano-mechanical resonators at millikelvin temperatures. A. VENKATESAN, K. LULLA, M.J. PATTON, A.D. ARMOUR, C.J. MELLOR, J.R. OWERS-BRADLEY, University of Nottingham — A magneto-motive detection scheme has often been employed to study dissipation in semiconducting nano-mechanical resonators at millikelvin temperatures. This scheme involves placing the beam in a large applied magnetic field and driving the mechanical resonance by sending rf currents through a thin metal electrode plated on the beam. The motion is then detected by measuring the induced e.m.f in the electrode. As a first step in understanding possible damping effects due to metallic films, we have fabricated free standing metallic resonators. We have fabricated doubly clamped beams out of Au and Au/Pd alloys (dimensions length $3-5\mu m$,thickness $\approx 50nm$ and width $\approx 200nm$). Beams of this dimension have a resonant frequency around $5-10$ MHz. We will report measurements, performed in a dilution refrigerator,of the quality factor Q in these resonators as a function of temperature and magnetic field (up to 15 T).

A. Venkatesan
University of Nottingham

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