

Abstract Submitted
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Internal friction of a one micron thick silver film between 1 mK and 1 K¹ ANDREW FEFFERMAN, R. O. POHL, J. M. PARPIA, Cornell University — Metal films are useful for thermalization and electrostatic actuation of both macroscopic and nanoscale oscillators at low temperatures. However, the effect of the metal film on the dynamics of the oscillator substrate is not always known since previous measurements of the internal friction Q^{-1} of metal films extend down down to a few hundred mK. Measurements of X. Liu *et al* [Phys. Rev. B **59**, 11767 (1999)] showed that between 0.5 and 1 K many micron-thick metal films exhibit a Q^{-1} plateau at the level of several 10^{-4} , but the existence of the plateau below 500 mK was unknown. We have measured Q^{-1} of a one micron thick silver film between 1 mK and 1 K using a single crystal silicon double paddle oscillator substrate vibrating at 5.5 kHz. Q^{-1} of the substrate was measured prior to deposition of the film so that Q^{-1} of the film alone could be extracted from measurements of the composite oscillator. Q^{-1} of the silver film was nearly constant at 4×10^{-5} between 1 and 10 mK and increased to 10^{-4} as temperature increased from 10 mK to 1 K. These data will be valuable for future experiments on metal coated silicon or silicon nitride resonators at mK temperatures.

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