

Abstract Submitted
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Calibration of the Modal Parameters of a Microcantilever from Gas Dissipation¹ CHARLES LISSANDRELLO, KAMIL L. EKINCI, Department of Mechanical Engineering, Boston University — We determine the modal mass and the spring constant of a microcantilever from fluidic dissipation measurements. In all experiments the device is held in a vacuum chamber, and its oscillations are monitored using a sensitive heterodyne interferometer. First, thermal fluctuations of the device are measured, and the modal parameters are established. Second, the microcantilever is driven, and its dissipation is measured as a function of the gas pressure in the chamber. These dissipation measurements, combined with a theory to describe gas damping in the kinetic regime, allow us to estimate the effective modal mass and the spring constant. The measurements are repeated for multiple mechanical modes of the same device and for multiple devices. All modal parameters from the dissipation measurements are compared to those obtained from the thermal noise measurements and are found to be in excellent agreement.

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Charles Lissandrello
Department of Mechanical Engineering, Boston University

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