

Abstract Submitted
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Fluid-Induced Nanomechanical Fluctuations of an Elastic Membrane¹ CHARLES LISSANDRELLO, VICTOR YAKHOT, KAMIL L. EKINCI, Boston University — We study the mechanical fluctuations of an elastic membrane induced by collisions with surrounding gas molecules. The system under study is a mm² 200-nm-thick silicon nitride membrane under tension. The membrane has well-separated resonant modes, which are accurately described by elasticity theory. The membrane is held in a vacuum chamber, and the frequency spectrum of its fluctuations are monitored, as a function of gas pressure, using a sensitive heterodyne interferometer. Our measurements, combined with the fluctuation-dissipation theorem, provide insight into solid-fluid interactions at the nanoscale.

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