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**Dynamic Similarity Principle for Nanoscale Resonant Devices in Gaseous Environments** CARYN BULLARD, MICHAEL ROUKES, California Institute of Technology, JOHN SADER, JIANCHANG LI, PAUL MULVANEY, The University of Melbourne — The mechanical performance of cantilevers on the nanoscale operating in atmosphere is dominated by gas damping. However, theoretical modeling of gas-solid interactions on the nanoscale is non-trivial due to the non-continuum nature of the gas flow. In addition, these gas-structure interactions can significantly affect the sensitivity of these devices. Instead of using numerical simulations to determine the gas flow and consequently, gas damping, of a nanoscale device, we used a general dynamic similarity principle to determine the gas damping of a nanoscale device by measuring the gas damping of a scaled up prototype device.

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