

Abstract Submitted
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Electrostatic actuation of commercial AFM cantilevers¹ CHRISTIAN LONG, NIST, UMD, RACHEL J. CANNARA, Center for Nanoscale Science and Technology, NIST, Gaithersburg, MD 20899 — We present an atomic force microscope (AFM) cantilever holder for electrostatic actuation of AFM cantilevers. The cantilever holder contains an electrode that is positioned behind the AFM cantilever, making this implementation of electrostatic actuation compatible with a wide variety of samples and commercially available AFM tips. Local electrostatic actuation of the cantilever eliminates the excitation of spurious mechanical resonances associated with the cantilever holder, making it an attractive alternative to piezoelectric actuation. Avoiding spurious mechanical resonances is most important for situations in which the cantilever's quality factor is low compared to the quality factors of the spurious mechanical resonances. These spurious resonances typically have quality factors of less than 50, so they are not an issue for applications such as routine tapping mode imaging in air. However, for applications where the quality factor of the cantilever is low, as is the case in contact resonance spectroscopy or in fluid environments, electrostatic actuation can be highly advantageous compared to piezoelectric actuation.

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