

Abstract Submitted  
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**Correlation of Noise in Multiple Cantilever Modes** DORAN SMITH, DIMITRI ALEXSON, US Army Research Lab — The ultrasensitive cantilevers utilized in frequency detection MRFM schemes are susceptible to noncontact interactions between the cantilever tip and the sample. Large efforts have been undertaken to comprehensibly understand the surface related dissipation mechanisms. We propose that sample dielectric fluctuations near DC frequencies should effect all the driven cantilever's oscillatory modes similarly. Utilizing the fundamental and second harmonic mode of the cantilever we have demonstrated this. The correlation between the frequency deviations of the two modes of a driven cantilever increases as the tip-to-sample distance decreases and the measured  $1/f$  noise due to dielectric fluctuations becomes manifest. This result provides additional support for the theory developed by Yazdanian, Marohn and Loring, J. Chem. Phy. 128, 224706 (2008) explaining the origins of noncontact friction and frequency jitter.

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