

Abstract Submitted  
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**Development of Variable Temperature NMR Force Microscopy<sup>1</sup>**

ISAAC V. MANZANERA ESTEVE, JOHN T. MARKERT, University of Texas. Physics Department — We report our progress on the construction of a variable temperature NMR force microscopy probe and the development of its control system for three dimensional nanoscale scanning. The probe contains two 3-axis piezo-driven slip-stick motion stages for fiber interferometer and for gradient magnet positioning. The control station is a LabView software based control system capable to perform signal generation and data acquisition. Preliminary scan position dependent NMR Force measurements on ammonium sulfate  $(\text{NH}_4)_2\text{SO}_4$  were performed at room temperature in a sample-on-oscillator configuration. Both piezo-driven and thermal noise cantilever motion have been analyzed to determine resonant frequencies  $\omega_c$ , quality factor  $Q$ , and spring constants  $k$ ; a typical cantilever yielded  $\omega_c = 1494.40 \pm 0.10\text{Hz}$ ,  $k = 0.039 \pm 0.004\text{N/m}$ ,  $Q = 93$ . RF frequency-modulation-driven artifact effects have been observed and measured during analysis.

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