Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

**Using Nuclear Magnetic Resonance Force Microscopy with Cross-Polarization for Nuclear Magnetization Enhancement and Heteronuclear Decoupling**[1] ROSA ELIA CÁRDENAS, JOHN T. MARKERT, Department of Physics, University of Texas at Austin — We report our progress in applying Nuclear Magnetic Resonance Force Microscopy (NMRFM) to study position-dependent cross-polarization effects in ammonium hexafluorophosphate ($NH_4PF_6$). Cross polarization (CP) is typically used either to enhance the polarization of a weak or rare species, or to decouple one species from its dipolar interactions with another, that is, for line narrowing. With the added local probe abilities of NMRFM, particularly the presence of a strong field gradient, new techniques for coupling spins in nearby resonant slices are possible. The $NH_4PF_6$ system has three NMR-active nuclei: the stronger $^1$H and $^{19}$F nuclear moments, and the weaker and more rare $^{31}$P moments. We will examine the various effects of coupling $^1$H and/or $^{19}$F with $^{31}$P, including efficient frequency-sweep matching for optimization of the CP rate. We will also examine local effects dependent on excitation and detection slice geometry, and the dynamical effects of $NH_4^+$ and $PF_6^-$ reorientations.

[1]This work was supported by NSF Grant No. DMR-0605828.

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Date submitted: 27 Nov 2007 Electronic form version 1.4