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Tip design and tip-sample interaction in magnetic resonance force microscopy SEAN GARNER, Department of Physics, Cornell University, SEPPE KUEHN, JOHN MAROHN, Department of Chemistry and Chemical Biology, Cornell University — Magnetic resonance force microscopy (MRFM) is a three-dimensional, subsurface imaging technique which registers the presence of sample spins via the deflection, or change in mechanical resonance frequency, of a magnet-tipped cantilever. At single-nuclear-spin sensitivity, MRFM would have numerous exciting applications, such as imaging of single biomolecules or spin-state readout for solid-state quantum computing. We have previously reported unprecedented sensitivity in nuclear MRFM, and are currently improving our sensitivity by attacking two remaining technical challenges: producing usable nanomagnetic tips, and learning to control excess cantilever energy dissipation to the sample surface. We will discuss our recent results in these areas and our latest MRFM results.

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