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FePt nanoparticles as high resolution magnetic force microscope (MFM) probes LISA QIAN, Stanford University, JAEMIN KIM, Brown University, JOHN KIRTLEY, BEENA KALISKY, Stanford University, SHOUHENG SUN, Brown University, KATHRYN MOLER, Stanford University — Current MFM probes are often fabricated by sputtering a magnetic thin film across the entirety of an atomic force microscope (AFM) cantilever, limiting their spatial imaging resolution to about 30nm. We report our progress on improving this resolution by using single crystal, high-coercivity ferromagnetic FePt nanoparticles as magnetic sensors for MFM. By attaching nanomagnets 5-10 nm in diameter to the end of a functionalized AFM tip, this technique has potential for an image resolution of under 10nm. We are attempting to characterize the magnetic properties of a single nanomagnet using a novel scanning SQUID susceptometer capable of raising the sample temperature well above the SQUID temperature, with a SQUID pickup loop diameter and sensor-sample spacing well below a micron.

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