

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Atomic Force Microscope Tip for Dielectrophoresis¹ J.A. AGUILAR, T.P. HUNT, Department of Physics, Harvard University, Cambridge, MA, A.C. BLESZYNSKI, Department of Physics, Yale University, New Haven, CT, R.M. WESTERVELT, Department of Physics, Harvard University, Cambridge, MA — Bottom-up fabrication of nanoscale structures has long been an aspiration of the nanotechnology community. We have designed and built an AFM tip with coaxial electrodes that produces a very high field gradient. Dielectrophoresis (DEP) in a strong localized, RF electric field is useful for manipulating nanoparticles in a fluid, performing electric force microscopy, and reading and writing data on ferroelectric materials. The capabilities of an AFM allow imaging the sample before and after manipulation with DEP, and the sharpness of the AFM tip gives high spatial resolution. The inner electrode is formed by a doped Si AFM tip, which is insulated from the grounded outer shield by a thin thermal Si oxide layer. The field lines escape through a small hole in the outer shield cut at the tip's point by a focused ion beam. Currently, the tip diameter is about 300 nm; this can easily be made smaller. This sets the stage for experimentation on the actual manipulation of nanoscale particles with coaxial AFM tips.

¹Thanks to NSEC NSF grant PHY-0117795 and the NCI MIT-Harvard CCNE.

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Date submitted: 25 Nov 2006

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