Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Atomic-scale Nanoprobes Fabricated by Localized Ion Flux Reduction and Field-Directed Sputter Sharpening SCOTT SCHMUCKER, JOSEPH LYDING, University of Illinois at Urbana-Champaign — The Field-Directed Sputter Sharpening (FDSS) method for fabrication of atomic-scale metallic probes is explained as a localized reduction in ion flux at the probe apex, leading to a reduction in apex atom migration by surface diffusion and a corresponding decline in equilibrium radius of curvature. The resulting apices are found to exhibit reproducible, regenerable, stable and superior behavior as scanning tunneling microscopy tips, and to facilitate resolution-enhanced imaging and patterning. Here we describe and demonstrate the distinction between FDSS and conventional sputter erosion techniques by simulated and experimental sputter erosion sharpening, and demonstrate the capabilities of FDSS-sharpened probes for atomically-precise patterning of the Si(100) surface.

Scott Schmucker
University of Illinois at Urbana-Champaign

Date submitted: 20 Nov 2009 Electronic form version 1.4