Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Single vortex manipulation in superconducting $NdFeAsO_{1-x}F_x$ MAGDALENA HUEFNER, JEEHOON KIM, Harvard University, MATT TILLMAN, PAUL CANFIELD, Ames Laboratory and Iowa State University, JENNIFER HOFFMAN, Harvard University — Vortex pinning challenges have severely hampered attempts to incorporate cuprate high T_c superconductors into technology. Understanding and improving the pinning of quantized magnetic vortices in high T_c superconductors remains an important challenge. We use a homebuilt low temperature magnetic force microscope to image and manipulate individual vortices in single crystal $NdFeAsO_{1-x}F_x$ (T_c=50K). By exerting a large force on a single vortex we can deliberately depin it from its original position and permanently move it to a different, predetermined position. We can also drag the top of a single vortex for a short distance without permanently depinning its full length. By dragging individual vortices along different directions, we observe a 4-fold anisotropy of the dragging distance, with the easy-drag direction along the Fe-Fe axis. Our results shed light on the questions of anisotropy and pinning mechanisms in iron pnictides.

Magdalena Huefner
Harvard University

Date submitted: 10 Nov 2011 Electronic form version 1.4