Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Single vortex pinning and penetration depth in superconducting $\mathbf{NdFeAsO_{1-x}F_x}$ JESSIE T. ZHANG, Massachusetts Institute of Technology, JEEHOON KIM, MAGDALENA HUEFNER, Harvard University, CUN YE, Tsinghua University, STELLA KIM, PAUL CANFIELD, RUSLAN PROZOROV, Iowa State University, OPHIR M. AUSLAENDER, Technion - Israel Institute of Technology, JENNIFER E. HOFFMAN, Harvard University — We use a magnetic force microscope (MFM) to investigate single vortex pinning and penetration depth in $NdFeAsO_{1-x}F_x$, one of the highest-T_c iron-based superconductors. In fields up to 20 Gauss, we observe a disordered vortex arrangement, implying that the pinning forces are stronger than the vortex-vortex interactions. By manipulating the vortices using the MFM tip, we obtain single vortex depinning forces for vortices in $NdFeAsO_{1-x}F_x$. Moreover, our MFM measurements allow the first local and absolute measurement of the superconducting penetration depth in $NdFeAsO_{1-x}F_x$ to nanometer scale resolution.

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Date submitted: 14 Nov 2014 Electronic form version 1.4