Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Similarity Between Fe-based Pnictide Superconductors and High-T_c Cuprates Revealed by the Irreversible Magnetic Behavior in the Vortex State RUSLAN PROZOROV, M.A. TANATAR, C. MARTIN, R.T. GORDON, E.C. BLOMBERG, P. PROMMAPAN, V.G. KOGAN, N. NI, M.E. TILLMAN, S.L. BUD'KO, P.C. CANFIELD, Ames Laboratory and Department of Physics & Astronomy, Iowa State University — Static and dynamic measurements of DC magnetization and direct real-time magneto-optical imaging have revealed unconventional vortex behavior in $NdFeAsO_{0.9}F_{0.1}$[1] and $Ba(Fe_{0.93}Co_{0.07})_2As_2$[2] single crystals. In particular, the fishtail effect, giant magnetic relaxation and a crossover from elastic to plastic vortex creep, reminiscent of similar features found in pure single crystals of Y-Ba-Cu-O and Nd-Ce-Cu-O cuprates. Moreover, despite weak anisotropy of the London penetration depth and second critical field, vortex properties of the pnictides are shown to be very anisotropic. We discuss possible explanations of the observed behavior and conclude that pnictide superconductors bridge a gap between s-wave multiband MgB_2 and highly anisotropic d-wave cuprates.

[1]R. Prozorov *et al.* arXiv:0805.2783 (2008)
[2]R. Prozorov *et al.*, Phys. Rev. B in print (2008). arXiv:0810.1338

Ruslan Prozorov
Ames Laboratory and Dept of Physics & Astronomy, Iowa State University

Date submitted: 01 Dec 2008 Electronic form version 1.4