Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Anomalous High-Field Meissner Effect in Pnictide Superconductors RUSLAN PROZOROV, MAKARIY A. TANATAR, SERGEY L. BUD'KO, PAUL C. CANFIELD, Ames Laboratory, Ames, IA 50011, USA, BING SHEN, PENG CHENG, HAI-HU WEN, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China — The Meissner effect has been studied in $Ba(Fe_{0.926}Co_{0.074})_2As_2$ and $Ba_{0.6}K_{0.4}Fe_2As_2$ single crystals and compared to well known, type-II superconductors $LuNi_2B_2C$ and V_3Si. Whereas flux penetration is mostly determined by the bulk pinning (and, perhaps, surface barrier) resulting in a large negative magnetization, the flux expulsion upon cooling in a magnetic field is very small, which could also be due to pinning and/or surface barrier effects. However, in stark contrast with the expected behavior, the amount of the expelled flux increases almost linearly with the applied magnetic field, at least up to our maximum field of 5.5 T, which far exceeds the upper limit for the surface barrier. One interpretation of the observed behavior is that there is a field-driven suppression of magnetic pair-breaking.

Ruslan Prozorov
Ames Laboratory

Date submitted: 10 Nov 2010 Electronic form version 1.4