

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Determination of anisotropic H_{c2} in $(\text{Ba}_{0.55}\text{K}_{0.45})\text{Fe}_2\text{As}_2$ single crystals¹ C. H. MIELKE, M. M. ALTARAWNEH, K. COLLAR, Los Alamos National Laboratory, N. NI, S. L. BUD'KO, P. C. CANFIELD, Ames Laboratory, NHMFL-PFF TEAM, DEPARTMENT OF PHYSICS AND ASTRONOMY, IOWA STATE UNIVERSITY TEAM — The radio frequency penetration depth was measured in the superconductor $(\text{Ba}_{0.55}\text{K}_{0.45})\text{Fe}_2\text{As}_2$ under pulsed magnetic fields extending to 60 tesla and down to 14 K. Using these data we are able to infer a $H_{c2}(T)$, $H - T$ phase diagram, for applied fields parallel and perpendicular to the crystallographic c -axis. The upper critical field curvature is different for the respective orientations but they each remain positive down to 14 K. The upper critical field anisotropy is moderate, ≈ 3.5 close to T_c , and drops with the decrease of temperature, reaching ≈ 1.2 at 14K. These data and analysis indicate that (i) $(\text{Ba}_{0.55}\text{K}_{0.45})\text{Fe}_2\text{As}_2$ anisotropy diminishes with temperature and has an unusual temperature dependence, (ii) $H_{c2}(T = 0)$ for this compound may easily approach fields of 75 tesla.

¹LANL LDRD-DR20070013, DoE DE-AC02-07CH11358, NSF-DMR 0602859, DoE DMR-0654118

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Date submitted: 21 Nov 2008

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