Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Penetration Depth and Quasiparticle Conductivity in Iron-based High-Temperature Superconductors KEN-ICHIRO HASHIMOTO, TAKASADA SHIBAUCHI, TOMONARI KATO, KOSUKE IKADA, RYUJI OKAZAKI, HIROAKI SHISHIDO, Department of Physics, Kyoto University, C.J. VAN DER BEEK, M. KONCZYKOWSKI, Ecole Polytechnique, HIJIRI KITO, AKIRA IYO, HIROSHI EISAKI, AIST, MOTOYUKI ISHIKADO, SHIN-ICHI SHAMOTO, JAEA, H. TAKEYA, K. HIRATA, NIMS, SHIGERU KASAHARA, TAKAHITO TERASHIMA, Research Center for Low Temperature and Materials Sciences, Kyoto University, YUJI MATSUDA, Department of Physics, Kyoto University — We measure the in-plane penetration depth and the quasiparticle conductivity in the newly discovered Fe-based high-temperature superconductors $PrFeAsO_{1-y}$[1] and $Ba_{1-x}K_xFe_2As_2$[2], using a sensitive superconducting resonator. We show that the penetration depth exhibits a very flat behavior at low temperatures in both compounds, which indicates that the superconducting gap opens up all over the Fermi surface. The temperature dependence of the superfluid density is well fitted with the two gap model, suggesting the multi-gap nature of superconductivity in this system. Moreover, the observed large enhancement of the quasiparticle conductivity suggests a suppression of the quasiparticle scattering, reminiscent of the superconductors in strongly correlated electronic systems.[1] K. Hashimoto et al., arXiv:0806.3149., [2] K. Hashimoto et al., arXiv:0810.3506.

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Date submitted: 21 Nov 2008 Electronic form version 1.4