

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Multi-band model analysis of transport properties of Ba(FeAs)₂
HUYNH KHUONG, YOICHI TANABE, TAKAHIRO URATA, SATOSHI HEGURI, Department of Physics, Graduate School of Science, Tohoku University, TAKANORI KIDA, MASAYUKI HAGIWARA, Center for Quantum Science and Technology under Extreme Conditions (KYOKUGEN), Osaka University, KATSUMI TANIGAKI, Department of physics, Graduate school of science & WPI-Advanced Institute for Materials — In iron pnictides, unique energetic band topology and interband antiferromagnetic scatterings are the main sources of rich physics, including multiband superconductivity and Dirac cones quantum states [1, 2]. Despite its importance, the band structure of iron pnictides is not fully understood, especially in terms of transport phenomena. In this meeting, we present that the transport properties of Ba(FeAs)₂, a typical iron pnictide compound, are strongly affected by the shape of Fermi surfaces and the high mobility (μ) in the Dirac cones. From magnetic-field (B) dependencies of the conductivity tensor under $B < 50$ T, we successfully extracted a spectrum of carrier number as a function of μ . Whereas the hole side of the spectra is purely characterized by parabolic hole pockets, the electron side shows interesting effects originating from partly concave Fermi pockets as well as the very high μ ($50,000 \text{ cm}^2\text{V}^{-1}\text{s}^{-1}$) of the Dirac carriers. Our observations are also in a good agreement with the first principles band calculations and experimental spectroscopic observations on its Fermi surface [3, 4]. [1] K. Kuroki et al, PRL 101 (2008) [2] Ran et al, PRB 79 (2009) [3] Yin et al, Nat.Phys. 7 (2011) [4] T. Shimojima, PRL 104 (2010)

Khuong Huynh
Department of physics, Graduate school of science &
WPI-Advanced Institute for Materials

Date submitted: 15 Nov 2012

Electronic form version 1.4