Fermi Surface Studies of Iron-Pnictide Superconductors: $BaFe_2As_2$ vs. KFe_2As_2

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Recently, we have completely determined the Fermi surface in the antiferromagnetic orthorhombic phase of $BaFe_2As_2$ by measuring Shubnikov-de Haas oscillations in *detwinned* single crystals of unprecedentedly high quality (RRR = 40–60) (T. Terashima *et al.*, arXiv:1103.3329). The Fermi surface consists of one hole and two electron pockets, and the carrier number is 0.024 holes and electrons per primitive unit cell. The observed Fermi surface can well be accounted for by an LSDA band-structure calculation using the experimental crystal structure. The mass enhancements m^*/m_{band} are found to be 2–3. The Sommerfeld coefficient estimated from the determined Fermi surface and effective masses agrees well with an experimental value. Previous ARPES reports are not very consistent with our determined Fermi surface. We will discuss these data in comparison with corresponding data for KFe_2As_2, where we have found a remarkable discrepancy between the observed and calculated Fermi surface areas and large mass enhancements (3–20) (T. Terashima *et al.*, J. Phys. Soc. Jpn. **79**, 053702 (2010)).