## Three-dimensional Fermi surfaces and their nesting properties in the iron pnictide superconductor $BaFe_2(As_{1-x}P_x)_2$

**T. Yoshida**[a, b], S. Ideta[a], I. Nishi[a], A. Fujimori[a, b], T. Shimojima[a], W. Malaeb[c], S. Shin[b, c], Y. Nakashima[d], H. Anzai[d], A. Ino[b, d], M. Arita[d], H. Namatame[d], M. Taniguchi[d], M. Kubota[e], K. Ono[e], S. Kasahara[f], T. Shibauchi[f], T. Terashima[f], Y. Matsuda[f], M. Nakajima[a], S. Uchida[b, a], Y. Tomioka[b,g], T. Ito[b, g], K. Kihou[b,g], C. H. Lee[b,g], A. Iyo[b,g], H. Eisaki[b, g], H. Ikeda[b, f], and R. Arita[b, a]

[a]Univ. of Tokyo, [b]JST-TRIP, [c]ISSP, [d]Hiroshima Univ., [e]KEK-PF, [f]Kyoto Univ., [g]AIST

Most of experimental studies on the iron-pnictide superconductors have so far indicated that the superconducting gap opens on the entire Fermi surfaces. However, the isovalent-substituted system $BaFe_2(As_{1-x}P_x)_2$ shows signatures of superconducting gap with line nodes[1], which would give critical information to clarify the pairing mechanism. According to the theory of spin-fluctuation-mediated pairing mechanism, three-dimensional nodes in the superconducting gap may appear in the strongly warped hole Fermi surface[2]. Therefore, it is crucial to reveal the three-dimensional electronic structure of the this system for understanding the superconductivity. By angle-resolved photoemission spectroscopy, we find that one of the hole Fermi surfaces has a highly three-dimensional shape and shows poor nesting with the electron Fermi surfaces at the optimal composition. This hole Fermi surface becomes disconnected along $k_z$ direction for large $x$, which may lead to the suppression of the superconductivity.

[1]K. Hashimoto *et al.*, Phys. Rev. B **81**, 220501 (2010).
[2]K. Suzuki, H. Usui, and K. Kuroki, J Phys. Soc. Jpn. **80**, 013710 (2011).