Novel properties in Josephson junctions involving $s_{x^2y^2}$-pairing state in Iron-Pnictides WEI-FENG TSAI, DAO-XIN YAO, JIANGPING HU, Purdue University, B. ANDREI BERNEVIG, Princeton University — We present theoretical results of Andreev bound states in superconductor-normal metal (or insulator)-iron-pnictide junctions. Within the two-orbital exchange coupling model [1], the presence of non-trivial in-gap states, which uniquely appear in the s-wave $\cos k_x \cos k_y$ ($s_{x^2y^2}$) pairing state, can be taken as a sharply distinct feature in contrast to other singlet pairing states. In addition, a proposed novel trilayer π-junction involving $s_{x^2y^2}$ superconductivity is also discussed as a new possible signature of such unconventional pairing symmetry.

[1] K. Seo, B. A. Bernevig, and J. Hu, Phys. Rev. Lett. 101, 206404 (2008).

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