Electronic Evidence of Unusual Magnetic Ordering in a Parent Compound of FeAs-Based Superconductors

Xingjiang Zhou*

National Lab for Superconductivity, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China

High resolution angle-resolved photoemission measurements have been carried out on BaFe$_2$As$_2$, a parent compound of the FeAs-based superconductors. In the magnetic ordering state, there is no gap opening observed on the Fermi surface. Instead, dramatic band structure reorganization occurs across the magnetic transition. The appearance of the singular Fermi spots near ($\pi, \pi$) is the most prominent signature of magnetic ordering. These observations provide direct evidence that the magnetic ordering state of BaFe$_2$As$_2$ is distinct from the conventional spin-density-wave state. They reflect the electronic complexity in this multiple-orbital system and necessity in involving the local magnetic moment in describing the underlying electron structure.


*In collaboration with Guodong Liu, Haiyun Liu, Lin Zhao, Wentao Zhang, Xiaowen Jia, Jianqiao Meng, Xiaoli Dong, Jun Zhang, G. F. Chen, Guiling Wang, Yong Zhou, Yong Zhu, Xiaoyang Wang, Zuyan Xu and Chuangtian Chen