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Electronic Structure of Spin-Orbital-Coupling-Driven Insulator Sr_2IrO_4 from Angle-Resolved Photoemission Spectroscopy YAN LIU, XIAOWEN JIA, DAIXIANG MOU, LIN ZHAO, JUNFENG HE, GUODONG LIU, SHAOLONG HE, YINGYING PENG, CHAOYU CHEN, XIAOLI DONG, JUN ZHANG, National Lab for Superconductivity, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics CAS, Beijing 100190, China, ZUYAN XU, CHUANGTIAN CHEN, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing 100190, China, GANG CAO, Center for Advanced Materials and Department of Physics and Astronomy, University of Kentucky, X.J. ZHOU, National Lab for Superconductivity, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics CAS, Beijing 100190, China — Sr_2IrO_4, as a Mott Insulator, is an ideal system to study spin orbital coupling interaction in transition metal oxides. We report a comprehensive investigation on electronic structure of Sr_2IrO_4 by high resolution angle-resolved photoemission spectroscopy (ARPES). We measured the Fermi surface and band structures at different photon energies, under different photon polarizations. New features have been revealed that were not observed in previous studies. Moreover, the measurement under different polarizations helps identify different orbital characteristics of bands. The comparison between our experimental observations and theoretical calculation proves the important role of spin-orbital coupling interaction in determining its electron structure. The rich information on the electron structure of Sr_2IrO_4 will provide key insights in understanding the mechanism of various electron interactions in determining its insulator ground state.

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