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Electronic structure of Sr_2IrO_4 and its doped materials measured by angle-resolved photoemission spectroscopy
QIANG WANG, YUE CAO, J.A. WAUGH, S.R. PARK, University of Colorado at Boulder, TONGFEI QI, OLEKSANDR KORNETA, GANG CAO, University of Kentucky, D.S. DESSAU, University of Colorado at Boulder — The electronic structure of iridate Sr_2IrO_4 and its doped materials $\text{Sr}_2\text{Ir}_{1-x}\text{Rh}_x\text{O}_4$ and $(\text{Sr}_x\text{La}_{1-x})_2\text{IrO}_4$ were investigated by angle-resolved photoemission spectroscopy. For Sr_2IrO_4 , which is a $J_{eff}=1/2$ Mott insulator driven by strong spin-orbit coupling, the dispersion of the predominant Ir 5d bands has been successfully resolved and compared with theoretical calculations. The overall band structure is in line with LDA calculations with strong spin-orbit coupling and moderate electron correlation effects included. The detailed electronic structures of isovalent-doped $\text{Sr}_2\text{Ir}_{1-x}\text{Rh}_x\text{O}_4$ and electron-doped $(\text{Sr}_x\text{La}_{1-x})_2\text{IrO}_4$ are also obtained and compared with the electronic structure of the mother compound. These results help reveal the delicate interplay between charge, spin, orbit, and lattice degrees of freedom in iridates and other correlated electron systems.

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