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Probing spatial evolution of local density of states in Sr3Ir2O7 YOSHINORI OKADA, DANIEL WALKUP, WENWEN ZHOU, Boston College, TAY-RONG CHANG, National Tsing Hua University, HSIN LIN, Northeastern University, SOVIT KHADKA, CHETAN DHITAL, Boston College, HORNG-TAY JENG, National Tsing Hua University, ARUN BANSIL, Northeastern University, ZIQIANG WANG, STEPHEN WILSON, VIDYA MADHAVAN, Boston College — Amongst the iridate families, the Ruddlesden-Popper series ($Sr_{n+1}Ir_nO_{3n+1}$) goes through a transition from insulator to metal with increasing n. Within this series the n =2 compound $Sr_3Ir_2O_7$ (Ir327) occupies a unique place, straddling a well-defined insulator (n =1) on one side and a metal (n =infinity) on the other, placing Ir327 in close proximity to a delicate and interesting transition point. In this study, we probe the spatial evolution of the local density of states (LDOS) of Ir327 by means of scanning tunneling spectroscopy. In the parent Ir327 compound, we find local regions of metallic density of states that exist within an underlying insulating electronic structure. Based on the experimental data, we discuss the mechanism of how this metallic LDOS evolves from the intrinsically gapped electronic structure in terms of spin-orbit and Coulomb interactions.

Yoshinori Okada
Boston College

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