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Destruction of J_{eff} =1/2 Mott Phase by A-site doping in $(Sr_{1-x}La_x)_3Ir_2O_7$ TOM HOGAN, CHETAN DHITAL, Boston College, ZAHRA YAMANI, Canadian Neutron Beam Centre, CYRIL OPEIL, STEPHEN WILSON, Boston College — Recent theoretical progress in describing the insulating behavior of the n=1 and n=2 Ruddlesden-Popper (RP) series iridates (Sr_2IrO_4 and $Sr_3Ir_2O_7$) has proposed a novel J_{eff} =1/2 Mott ground state. This new Mott phase theoretically arises from the splitting of the Ir 5d orbitals by the crystal field combined with further splitting of the t_{2g} manifold by relativistic spin-orbit coupling which then combines with a modest U to form a Mott insulating phase. Our group's previous work in Ir-site substitution of $Sr_3Ir_2O_7$ (Sr-327) has revealed a rich interplay of correlated effects, presenting a strong argument that correlation physics plays a dominant role in the ground state of this material. While doping the transition metal B-site with Ru^{4+} induces a percolative metal-insulator transition (MIT) with doped-holes remaining localized, it is known that the A-site doping of electrons results in a very abrupt MIT realized with only a small percentage level of doping ($\sim 3\%$). Here we present a combined transport and diffraction study exploring the evolution of electronic and structural properties in electron-doped $(Sr_{1-x}La_x)_3Ir_2O_7$ as it traverses the MIT in its electronic phase diagram. Elastic neutron scattering experiments alongside DC magnetization and electronic transport data will be presented exploring the ordering temperature, moment size, and the extent of any structural distortions present, as a function of dopant concentration.

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