Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Evolution of Structural and Electronic Phase Behavior in $Sr_3(Ir_{1-x}Mn_x)_2O_7$[1] JULIAN SCHMEHR, Materials Department, University of California, Santa Barbara, TOM HOGAN, Department of Physics, Boston College, and Materials Department, University of California, Santa Barbara, WEI TIAN, Quantum Condensed Matter Division, Oak Ridge National Laboratory, STEPHEN WILSON, Materials Department, University of California, Santa Barbara — $Sr_3Ir_2O_7$ is a rare example of a spin-orbit coupling (SOC) induced $J_{eff} = 1/2$ Mott antiferromagnet. Here, we present an investigation of the evolution of the electronic and structural properties of $Sr_3(Ir_{1-x}Mn_x)_2O_7$, with x up to 44%. $Sr_3Mn_2O_7$ is an antiferromagnetic insulator due to exchange splitting of the t_{2g} orbitals[2]. Nevertheless, hole-doping the B-site of $Sr_3Ir_2O_7$ with Mn should substantially renormalize the SOC required for the appearance of the Mott state. Our results from neutron diffraction and magnetic susceptibility show a suppression of the magnetic ordering temperature without a substantial increase in the ordered moment. While all measured samples remained insulating, the inflection in the resistivity at T_N is rapidly suppressed upon Mn substitution. Additionally, the monoclinic lattice distortion observed in $Sr_3Ir_2O_7$ is also substantially reduced. Mn-doping therefore represents an intriguing new pathway for the suppression of the Mott state, while also allowing for an investigation of the interplay between nuclear structure and electronic properties in the Ruddlesden-Popper iridates.

[1]Work supported under ARO Award W911NF-16-1-0361
[2]J.F. Mitchell *et al.*, *J. Appl. Phys.* **85**, 4352 (1999)

Julian Schmehr
Materials Department, University of California, Santa Barbara

Date submitted: 11 Nov 2016 Electronic form version 1.4