

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Evolution of Magnetism in Single-Crystal Honeycomb Iridates¹

JASMINKA TERZIC, T.F. QI, L. LI, University of Kentucky, V.S. CAO, Paul Lawrence Dunbar High School, Lexington, KY 40513, S.J. YUAN, M. TOVAR, G. MURTHY, R.K. KAUL, G. CAO, University of Kentucky — We report the successful synthesis of single-crystals of the layered iridate, $(\text{Na}_{1-x}\text{Li}_x)_2\text{IrO}_3$, $0 \leq x \leq 0.90$, and a thorough study of its structural, magnetic, thermal and transport properties. The new compound allows a controlled interpolation between Na_2IrO_3 and Li_2IrO_3 , while maintaining the novel quantum magnetism of the honeycomb Ir^{4+} planes. The measured phase diagram demonstrates a suppression of the Neel temperature at an intermediate x indicating that the magnetic order in Na_2IrO_3 and Li_2IrO_3 are distinct. X-ray data shows that for $x=0.70$ when the Neel temperature is suppressed the most, the honeycomb structure is least distorted, suggesting at this intermediate doping that the material is closest to the spin liquid that has been sought after in Na_2IrO_3 and Li_2IrO_3 . By analyzing our magnetic data with a single-ion theoretical model we also show that the trigonal splitting, on the Ir^{4+} ions changes sign from Na_2IrO_3 to Li_2IrO_3 .

¹This work was supported by the US National Science Foundation via grants DMR-0856234, DMR-1265162 and DMR- NSF DMR-1056536 (RKK).

Gang Cao
University of Kentucky

Date submitted: 13 Nov 2013

Electronic form version 1.4