Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Canted Antiferromagnetism and Unusual Intermediate Phase in Double Perovskite Iridates ($La_{1-x}Sr_x)_2ZnIrO_6$ WENKA ZHU, Department of Physics, Indiana University, Bloomington, WEI TONG, High Magnetic Field Laboratory, Chinese Academy of Sciences, CHI-KEN LU, Department of Physics, National Taiwan Normal University, JINMEI WANG, SHIXIONG ZHANG, Department of Physics, Indiana University, Bloomington — Iridates represent a unique material system that possesses both strong spin-orbit coupling (SOC) and electron correlation. The interplay between SOC and correlation could facilitate the emergence of novel electronic and magnetic states. In this work, we have performed a systematic study of the magnetic properties of a double perovskite iridate La_2ZnIrO_6 and its hole-doped compounds $(La_{1-x}Sr_x)_2ZnIrO_6$ via dc magnetization measurements and electron spin resonance (ESR) spectroscopy. The magnetic ground state of La_2ZnIrO_6 was demonstrated to be a canted antiferromagnetic (AFM) phase based on the observation of magnetic hysteresis loops and antiferromagnetic resonance in the ESR spectra. The nature of the canted AFM state can be understood with the Heisenberg exchange model plus the Dzyaloshinskii-Moriya interaction. Additionally, an intermediate superparamagnetic-like phase was observed between the high-temperature paramagnetic state and the low-temperature canted-AFM state. With the introduction of Ir^{5+} by Sr doping, the AFM interaction is weakened accompanied by an enhancement of electrical conductivity.

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Date submitted: 12 Nov 2014 Electronic form version 1.4