

Abstract Submitted  
for the MAR15 Meeting of  
The American Physical Society

**Trigonal crystal field effect in spin-orbit Mott insulating  $\text{Sr}_3\text{NiIrO}_6$**  JUN OKAMOTO, WEN-BIN WU, HIROFUMI ISHII, KANG-LI YU, NOZOMU HIRAOKA, RU-PAN WANG, Natl Synchrotron Rad Res Ctr, DENG-MING JUO, National Chiao Tung University, JIUNN CHEN, National Pingtung University of Education, VIVEKA SINGH, GUANG-YU GUO, National Taiwan University, QINGHUI JIANG, Postech, SANG-WOOK CHEONG, Rutgers University, KU-DING TSUEI, DI-JING HUANG, Natl Synchrotron Rad Res Ctr —  $\text{Sr}_3\text{NiIrO}_6$  is a member of  $5d$  transition-metal Ir oxides with a long chain alternating  $\text{Ni}^{2+}$  in trigonal prismatic coordination and  $\text{Ir}^{4+}$  in octahedral coordination along  $c$  axis.  $\text{Sr}_3\text{NiIrO}_6$  is considered to be a spin-orbit Mott insulator like  $\text{Sr}_2\text{IrO}_4$ . Since the Ir  $5d$  spin-orbit coupling (SOC) and crystal field (CF) effect in  $t_{2g}$  orbitals from trigonal distortion are comparable, however, competition between the SOC and CF effect makes the Ir  $5d$  electronic structures different from the so-called  $j_{eff} = 1/2$  ground state. The modified Ir  $5d$  electronic structures under the trigonal crystal field effect are still unclear. We have studied the Ir  $5d$  electronic structures of  $\text{Sr}_3\text{NiIrO}_6$  by using Ir  $L_3$ -edge resonant inelastic x-ray scattering and O  $K$ -edge x-ray absorption spectroscopy measurements. Through the analyses of the low-energy  $d-d$  excitations and the unoccupied Ir  $5d$  states, we discuss the influence of the competition of SOC and CF effects on the Ir  $5d$  electronic structures of  $\text{Sr}_3\text{NiIrO}_6$ .

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Date submitted: 14 Nov 2014

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