

Abstract Submitted  
for the MAR17 Meeting of  
The American Physical Society

**Optical Investigation on the Effect of Vortex Domains on Electronic Transitions in HoMnO<sub>3</sub> Single Crystals**<sup>1</sup> T. D. KANG, Center for Correlated Electron Systems, IBS; Dept. of Physics and Astronomy, Seoul Nat'l University, NARA LEE, H. Y. CHOI, Y. J. CHOI, Department of Physics, Yonsei University, S. C. CHAE, Department of Physics Education, Seoul Nat'l University — We investigated on the effect of vortex domain on the electronic transitions of HoMnO<sub>3</sub> using optical spectroscopy. We observed different characteristics for d-d and p-d electronic transitions, which are centered near 1.7 eV and 5 eV at room temperature, respectively. The band edge energy of the p-d transition with vortex domains appears to show a clear increase which is attributed to the reduced hybridization between O p and Mn d states, while characteristics of the d-d transition does have distinct difference between vortex and normal states. However, from temperature dependent measurement, on the contrary, we observed the peak position of the d-d transition varying significantly with temperature between 10K to 300K, while the edge energy of the p-d transition is almost invariable. Such huge shifts of the d-d transition peak energy with temperature is known due to the antiferromagnetic superexchange interaction between nearest-neighbor Mn ions separated by oxygens.

<sup>1</sup>This work was supported by the Institute for Basic Science (IBS) in Korea (IBS-R009-D1) and by the National Research Foundation of Korea (NRF) Grant funded by the Korean Government (MSIP) (No. NRF-2014R1A1A1003676, NRF-2016R1C1B2013709)

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Date submitted: 20 Nov 2016

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