Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Sorting Category: 10.1.3 (E)

Optical spectroscopy of magnetic exchange splitting above the Curie temperature in ferromagnetic $SrRuO_3$ thin film D.W. JEONG, C.H. KIM, C.H. SOHN, S.H. CHANG, H.J. PARK, T.D. KANG, Seoul National University, Y.S. LEE, Soongsil University, J.J. YU, T.W. NOH, Seoul National University — $SrRuO_3$ is a representative itinerant ferromagnetic material with the Curie temperature about 150K. To investigate the relation between magnetism and electronic structure, we measured temperature dependent optical spectra of $SrRuO_3$ thin film on $SrTiO_3$ substrate. With decreasing temperature, spectral weight transfer between 2.5eV and 3.2eV transition was observed. Comparing to the first-principles calculation, we attributed the weight transfer as a magnetic exchange splitting due to the Stoner transition. Interestingly, the exchange splitting remained above the Curie temperature, and destroyed near the room temperature. This observation indicates the long range magnetic ordering of $SrRuO_3$ is destroyed at the Curie temperature due to the transverse spin fluctuation not a Stoner transition. Moreover, using the optical sum rule of optical spectra, we systematically and quantitatively studied the ferromagnetic property of $SrRuO_3$ thin film.

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[X] Prefer Oral Session
[ ] Prefer Poster Session

Date submitted: 15 Dec 2011 Electronic form version 1.4