Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

**Orbital Ordering in Room Temperature Ferromagnet $Sr_3YCo_4O_{10.5}$ Studied by a Resonant X-ray Scattering** HIRONORI NAKAO, TETSUYA MURATA, DAISUKE BIZEN, YOUICH MURAKAMI, Tohoku Univ., SHINTARO ISHIWATA, JST-ERATO, WATARU KOBAYASHI, ICHIRO TERASAKI, Waseda Univ. — $Sr_{1-x}R_xCo_4O_{10.5}$ ($R$ =Y and lanthanide, $0.2 < x < 0.25$) has been found recently as a room temperature ferromagnet with $T_C \sim 340$ K, which is the highest $T_C$ among perovskite Co oxides. The crystal structure is formed with the $CoO_6$ octahedral layers and the $CoO_{4.25}$ layers, which stack along $c$ axis alternatively. By powder x-ray diffraction, the orbital state of $Co^{3+}$ ($3d^6$) was evaluated from the anisotropy of the $CoO_6$ octahedron in the ferromagnetic phase, and the $e_g$ orbital ordering of intermediate spin state was proposed as an origin of the ferromagnetism. [1] Therefore, the orbital ordering of Co ion has been investigated using a resonant x-ray scattering technique, and a signal resonating near Co $K$-edge was found clearly. We present an antiferro-orbital and spin-state ordering, and the physical properties can be explained by the ordering model. [1] S. Ishiwata et al., Phys. Rev. B **75** (2007) 220406.

Hironori Nakao
Tohoku Univ.

Date submitted: 24 Nov 2007 Electronic form version 1.4