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**Orbital Ordering in Room Temperature Ferromagnet  $\text{Sr}_3\text{YCo}_4\text{O}_{10.5}$  Studied by a Resonant X-ray Scattering**

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—  $\text{Sr}_{1-x}\text{R}_x\text{Co}_4\text{O}_{10.5}$  ( $R = \text{Y}$  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  $\text{CoO}_6$  octahedral layers and the  $\text{CoO}_{4.25}$  layers, which stack along  $c$  axis alternatively. By powder x-ray diffraction, the orbital state of  $\text{Co}^{3+}$  ( $3d^6$ ) was evaluated from the anisotropy of the  $\text{CoO}_6$  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.

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