

First Observation of Noble Ferro-type Orbital States revealed by Resonant X-ray Scattering Interference Technique

July 8 2005

In the contrast with many researches on orbital ordering in 3d and 4f electron systems, few studies were done on orbital ordering in 4d electron system so far. Among 4d electron systems, it is well known that $\text{Ca}_{2-x}\text{Sr}_x\text{RuO}_4$ possesses the rich and novel ground states such as Mott transition accompanied with orbital ordering for $x=0$, heavy mass Fermi liquid behavior near the critical point for $x=0.5$, and the orbital degenerated triplet superconductivity for $x=2$.

Dr. Masato Kubota (Photon Factory/KEK) Prof. Youichi Murakami (Tohoku Univ.), Dr. Masaichiro Mizumaki (SPring-8/JASRI), Dr. Satoru Nakatsuji (Kyoto Univ.), and co-workers have successfully detected ferro-type orbital states in $\text{Ca}_{2-x}\text{Sr}_x\text{RuO}_4$, by resonant x-ray scattering interference technique at the beamline BL46XU of SPring-8, which is the first observation in 4d Mott transition system. It is found that the underlying orbital dependent properties are the key to clarify complex phase diagram of $\text{Ca}_{2-x}\text{Sr}_x\text{RuO}_4$.

Published in [Physical Review Letters, 95, 026401 \(2005\)](#). Masato Kubota, Youichi Murakami, Masaichiro Mizumaki, Hiroyuki Ohsumi, Naoshi Ikeda, Satoru Nakatsuji, Hideto Fukazawa, and Yoshiteru Maeno. "Ferro-type Orbital State in Mott Transition System $\text{Ca}_{2-x}\text{Sr}_x\text{RuO}_4$ Studied by Resonant X-ray Scattering Interference Technique"

Source: [Photon Factory/KEK](#), [SPring-8](#)

Citation: First Observation of Noble Ferro-type Orbital States revealed by Resonant X-ray Scattering Interference Technique (2005, July 8) retrieved 26 April 2024 from <https://phys.org/news/2005-07-noble-ferro-type-orbital-states-revealed.html>

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