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Magnetic structure and 5d-electronic state in a pyrochlore iridate $\text{Eu}_2\text{Ir}_2\text{O}_7$

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The pyrochlore-type iridium oxide $\text{Eu}_2\text{Ir}_2\text{O}_7$ exhibits a metal-insulator transition at 120 K, accompanied by magnetic ordering. We performed resonant x-ray scattering (RXS) experiment with photon energies near the iridium absorption edge L3 to investigate the arrangement of Ir^{4+} magnetic moments. Magnetic RXS was observed in the insulating phase, providing direct evidence of long-range ordering of Ir^{4+} magnetic moments with a propagation vector of $(4n+2\ 0\ 0)$. Our single-crystal structure analysis revealed that the lattice retains its face-centered-cubic structure across the metal-insulator transition, indicating all-in-all-out magnetic order, where all the magnetic moments on the four vertices of each Ir^{4+} tetrahedron point inward or outward as shown in Fig. 1 [1]. To investigate the 5d-electronic state of Ir^{4+} , we performed resonant inelastic x-ray scattering (RIXS) experiment near the L3 edge. Obtained RIXS spectra indicate that the 5d-electronic state is affected by not only the spin-orbit interaction but also trigonal distortion of IrO_6 octahedron [2].

[1] H. Sagayama et al., *Phys. Rev. B* 87, 100403(R) (2013)., [2] D. Uematsu et al., to be submitted.

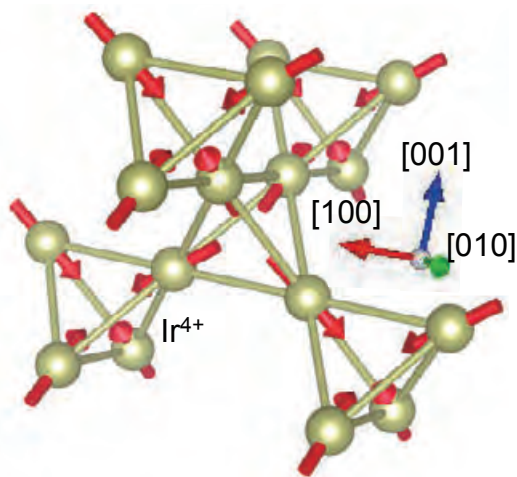


Figure 1

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