Magnetic Anisotropy of a 3-Dimensional Honeycomb Iridate Lattice

KIMBERLY MODIC, Los Alamos Natl Lab, MPA-CMMS TEAM — We present magnetic anisotropy measurements of a 3-dimensional honeycomb iridate lattice. The large spin-orbit coupling and the edge-shared octahedra create the possibility for large spin-anisotropic Kitaev exchange. The structure preserves the connectivity of the honeycomb lattice indicating its potential as a spin-liquid candidate. A complete temperature and angular dependence of torque measurements provides evidence for highly spin-anisotropic exchange interactions. At high temperature, the geometry of the octahedral environment and the iridium g-factor anisotropy constrain the susceptibility. Upon lowering temperature, we unambiguously identify a reordering of the principle components of susceptibility. An order of magnitude increase in anisotropy with field orientation at low temperature highlights the strong orbital character of the coupling.

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