

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Frustration in square lattice of Iridium $J_{eff}=1/2$ moments at high pressure¹ DANIEL HASKEL, Advanced Photon Source, Argonne National Laboratory, GILBERTO FABBRIS, Brookhaven National Laboratory, JONG WOO KIM, JUNG HO KIM, Advanced Photon Source, Argonne National Laboratory, BUMJOON KIM, Max Plack Institute for Solid State Research, GANG CAO, University of Kentucky, VIKTOR STRUZHKIN, Geophysical Laboratory, Carnegie Institution of Washington — We study the evolution of magnetic order in the weakly ferromagnetic, insulator Sr₂IrO₄ under applied pressure using x-ray resonant magnetic scattering and x-ray magnetic circular dichroism techniques in the diamond anvil cell. The weak inter-layer coupling is readily tunable with pressure giving rise to a change in magnetic structure followed by coexisting and competing magnetic phases with different inter-layer coupling. Application of moderate magnetic fields stabilizes one of the magnetic phases. Higher pressures drive the system into a magnetically disordered state, possibly a quantum paramagnetic state. We discuss the results in the context of a J₁-J₂ model where the increasing strength of next-nearest-neighbor exchange coupling with pressure leads to frustration of in-plane interactions

¹Work at Argonne is supported by the US Department of Energy, Office of Science, Office of Basic Energy Sciences, under Contract No. DE-AC-02-06CH11357.

Daniel Haskel
Advanced Photon Source, Argonne National Laboratory

Date submitted: 06 Nov 2015

Electronic form version 1.4