Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Field-induced orders in 3D Mott-Kitaev Li2IrO3 ALEJANDRO RUIZ, ALEX FRANO, NICHOLAS BREZNAY, ITAMAR KIMCHI, TONI HELM, Univ of California - Berkeley, IAIN OSWALD, JULIA CHAN, Univ of Texas - Dallas, ROBERT BIRGENEAU, Univ of California - Berkeley, ZAHIR ISLAM, Argonne National Lab, JAMES ANALYTIS, Univ of California - Berkeley — Honeycomb iridates have been the focus of substantial interest due to the strong magnetic frustration that arises from their edge-shared bonding environment, which favors a strongly anisotropic Ising-like exchange between bonds. In materials with edge-shared IrO6 octahedra, spin-anisotropy of the exchange between neighboring effective spin-1/2 states is enhanced by the interference of the two exchange paths across the planar Ir-O2-Ir bond. In the honeycomb lattice, such an interaction couples different orthogonal spin components for the three nearest neighbors; no single exchange direction can be simultaneously satisfied, leading to strong frustration which can be described by the Kitaev-model. Previous RXS experiments on the orthorhombic Li2IrO3 samples revealed an incommensurate, non-coplanar magnetic structure with counter-rotating moments, suggesting that Kitaev exchange is the dominant spin interaction in this system. In this work, we present thermodynamic and RXS data to illustrate in a concrete way how magnetic frustration and competing interactions combine to produce nearly degenerate and coexisting broken symmetry states.

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Date submitted: 11 Nov 2016 Electronic form version 1.4