Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Magnetic Properties comparison of 3D Kitaev candidate materials beta and gamma Li2IrO3 RAMON RUIZ, Univ of California - Berkeley, NICHOLAS BREZNAY COLLABORATION, ALEX FRANO COLLABORATION, TONI HELM COLLABORATION, JAMES ANALYTIS COLLABORATION — 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-O-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. We have recently synthesized two new structure that retains the same bonding environment as the honeycomb lattice, and extends this physics to three-dimensions. In this work, we compare the magnetic properties of these two novel structures, presenting evidences that their high temperature behavior can be explained by geometric g-factor constrains while the low temperature anisotropy and degeneracy of the ground state suggest the presence of spin anisotropic exchange.

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Date submitted: 19 Nov 2015 Electronic form version 1.4