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**Thermodynamic Study of 3D "Harmonic" Honeycomb $Li_2IrO_3$**[1]
ALEJANDRO RUIZ, TONI HELM, NICHOLAS BREZNAY, GILBERT LOPEZ, 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 $IrO_6$ 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-$O_2$-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 a new structure that retains the same bonding environment as the honeycomb lattice, and extends this physics to three-dimensions. Previous RMXD experiments on our orthorhombic ${}^{\mathcal{H}}\langle 1\rangle$-$Li_2IrO_3$ 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 study the thermal properties of our single crystals as a function of temperature and applied magnetic field.

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Alejandro Ruiz
Univ of California - Berkeley

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