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**Evidence for coexisting magnetic order in frustrated three-dimensional honeycomb iridates $Li_2IrO_3$** NICHOLAS BREZNAY, ALEJANDRO RUIZ, ALEX FRANO, JAMES ANALYTIS, University of California, Berkeley — The search for unconventional magnetism has found a fertile hunting ground in 5d iridium oxide (iridate) materials. The competition between coulomb, spin-orbit, and crystal field energy scales in honeycomb iridates leads to a quantum magnetic system with localized spin-1/2 moments communicating through spin-anisotropic Kitaev exchange interactions. Although early and ongoing work has focused on layered two-dimensional honeycomb compounds such as $Na_2IrO_3$ and a 4d analog, $RuCl_3$, recently discovered polytypes of $Li_2IrO_3$ take on three-dimensional honeycomb structures. Bulk thermodynamic studies, as well as recent resonant x-ray diffraction and absorption spectroscopy experiments, have uncovered a rich phase diagram for these three-dimensional honeycomb iridates. Low temperature incommensurate and commensurate magnetic orders can be stabilized by tuning the applied magnetic field, displaying a delicate coexistence that signals highly frustrated magnetism.

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