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Magnetic properties of hexagonal iridates

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Hexagonal iridates $A_2\text{IrO}_3$ ($A=\text{Na}, \text{Li}$) are discussed in the context of realizing magnetic Kitaev exchange between $j=1/2$ moments. This talk reports experimental investigation of magnetic properties of Na_2IrO_3 and $\alpha\text{-Li}_2\text{IrO}_3$, crystallizing in a layered honeycomb structure, as well as, the related “hyper-honeycomb” $\beta\text{-Li}_2\text{IrO}_3$. For the latter material, very recent magnetic resonant X-ray diffraction experiments allowed a complete solution of the magnetic structure. Incommensurate magnetic order with non-coplanar and counter-rotating Ir moments are found, similar as also realized in another polytype, the “stripyhoneycomb” $\gamma\text{-Li}_2\text{IrO}_3$. Theoretically, such structure is stabilized by dominant Kitaev interactions. The similarities between the two materials which share similar local connectivity between the Ir neighbors suggest dominating Kitaev magnetic exchange in both materials. Work in collaboration with F. Freund, S. Manni, Y. Singh, S. Choi and R. Coldea.