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Manifestations of Kitaev physics in thermodynamic properties of hexagonal iridates and α-$RuCl_3$[1]

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Kitaev model is hard to achieve in real materials. Best candidates available so far are hexagonal iridates M_2IrO_3 (M = Li and Na) and the recently discovered α-$RuCl_3$ featuring hexagonal layers coupled by weak van der Waals bonding. I will review recent progress in crystal growth of these materials and compare their thermodynamic properties. Both hexagonal iridates and α-$RuCl_3$ feature highly anisotropic Curie-Weiss temperatures that not only differ in magnitude but also change sign depending on the direction of the applied magnetic field. Néel temperatures are largely suppressed compared to the energy scale of the Curie-Weiss temperatures. These experimental observations will be linked to features of the electronic structure and to structural peculiarities associated with deviations from the ideal hexagonal symmetry. I will also discuss how the different nature of ligand atoms affects electronic structure and magnetic superexchange.

[1]This work has been done in collaboration with M. Majumder, M. Schmidt, M. Baenitz, F. Freund, and P. Gegenwart