

Spin-orbit Mott insulators, novel magnetic orders and spin liquids

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We discuss recent progress in understanding correlated materials with strong spin-orbit coupling. In particular, we focus on theoretical framework to understand topological phases of matter that include quantum spin liquid, topological insulators, and topological semi-metals. Novel magnetic order in spin-orbit Mott insulators proximate to the topological phases are also discussed. We consider applications of these ideas to recent experiments on various 5d transition metal oxides, especially 2D and 3D honeycomb iridates A_2IrO_3 as well as pyrochlore iridates $R_2Ir_2O_7$.