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Correlated electron physics in quantum materials

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In this talk, I will review recent developments of strongly correlated electron systems in transition metal materials. In particular, transition metal oxides exhibit novel quantum phases including unconventional superconductivity, electronic nematic phases, topological Mott insulators, and quantum spin liquids. This rich variety of phenomena stems from the interplay among charge, spin, orbital, and lattice degrees of freedom. After a general review, I will focus on Iridium-based oxides which display exotic magnetic phases and quantum spin liquids. Combined effects of spin-orbit coupling and electronic correlation will be also presented.

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