Spin-Orbit Tuned Ground States in Single-Crystal Iridates

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摘　要：

The most profound result of the ***spin-orbit interaction*** (SOI) on iridates is the ***Jeff=1/2 insulating state***, a new quantum state that represents the novel physics in the 5d-based systems. The SOI vigorously competes with Coulomb interactions, non-cubic crystal electric field and Hund's rule coupling, and critically biases their mutual competition to stabilize ground states with exotic behavior, which sharply contrasts with traditional models. Indeed, two conspicuous phenomena are commonly observed among layered iridates: **(1)** the Jeff = 1/2 insulating state, and **(2)** relatively high magnetic ordering temperatures and complex magnetic states that are not predicted by existing models. In this talk, we review the underlying physical properties of the layered iridates, and report results of our study that emphasizes spin-orbittuned ground states stabilized by chemical doping, application of pressure and magnetic field; these weak perturbations are capable of directly reducing the SOI so as to rebalance comparable interactions to generate a rich phase diagram of strongly competing ground states controlled by the SOI.