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RIXS Studies of Magnetic Excitations in Layered Iridates

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$5d$ Transition metal oxides lie at the intersection of strong spin-orbit coupling and electron correlation, and open a new playground for novel electronic phases with unconventional magnetic, superconducting, magneto-electric, and band-topological properties. In particular, a rich variety of magnetic phases are predicted from the magnetic interactions that take various forms ranging from Heisenberg to bond-directional dipolar-like couplings in the strong spin-orbit coupling limit. In this talk, I will review on these novel aspects of magnetism in iridates studied using resonant x-ray scattering techniques. Specifically, following topics will be discussed: (i) Heisenberg-like nature of magnetic coupling in Sr_2IrO_4 that sharply contrast with the unusually large spin-wave gap in $Sr_3Ir_2O_7$, (ii) the origin of strong Ising anisotropy in $Sr_3Ir_2O_7$, and (iii) the contrasting dynamics of "spin-orbit exciton" modes in the Heisenberg and Ising magnets.