



セミナーのご案内



日時: 2022年7月1日(金)15時~16時30分

場所: コラボレーション棟 3階307室(コラボ室)

講演者: Prof. Minhyea Lee (U. Colorado Boulder)

題目: Systematic characterization of crystal electric field effects and spin-phonon hybridization in CsYbSe₂

Insulating quantum magnets occupy a special position in condensed matter physics. Because of their freedom from the strong decoherence affecting charged systems, they are at the forefront of fundamental research into quantum matter, providing candidate systems for realizing novel ground states and exotic magnetic and topological excitations. For the same reason, they are also playing an increasingly crucial technological role in areas including spintronics and quantum information processing.

Magnetic rare-earth ions go beyond the straightforward paradigm of geometrical frustration in Heisenberg antiferromagnets by introducing competing energy scales, and in particular their strong spin-orbit coupling creates multiple split crystal electric-field levels, leading to anisotropic effective spin models with intrinsic frustration.

In this talk, I will present our recent analysis of the high-field magnetotropic response of CsYbSe₂, providing an unambiguous determination of the crystal-electric-field parameters as well as leading order exchange interactions in CsYbSe₂. In addition, we propose a novel and highly generic model to explain the field dependence of thermal conductivity of CsYbSe₂, where phonon heat conduction can acquire unique nontrivial field-dependence through the hybridization of acoustic phonons and spin flip excitations of the ground doublet, via strain-modulation of the magnetic g-tensor. This, in turn, advances our understanding of spin-phonon interaction in thermal transport, and will enrich our experimental tools for recognizing new spin states.