

Title “What's going on with α -RuCl₃?”

Abstract: The so-called “Kitaev” materials, such as α -RuCl₃, have recently emerged as exemplary magnetic systems displaying strongly anisotropic exchange interactions reminiscent of the Kitaev’s 2D honeycomb model and 3D analogues. However, deviations from the Kitaev point are expected to be large, leading to the question: How much of the enomenology of the spin-liquid is relevant to these materials? At zero field, although α -RuCl₃ orders antiferromagnetically, it exhibits a broad continuum of magnetic excitations, which coexists with sharp magnons below T_N . This unconventional observation led many works to interpret the breakdown of magnons in terms of fractionalization into the expected Majorana excitations of the Kitaev spin liquid. Furthermore, application of in-plane magnetic field suppresses this order, giving rise to a region exhibiting a large thermal Hall signal, reminiscent of the pure Kitaev model. In this talk, I will discuss our efforts to model these effects: (i) the current understanding of the magnetic Hamiltonian, (ii) the explanation of the magnon breakdown, and it's generality across the phase diagram, (iii) the possible role of spin-phonon coupling in the thermal transport.