Chez Pierre

Presents ...

Monday, April 9, 2018

12:00pm Noon

MIT Room 4-331

Chez Pierre Seminar

Peter Armitage - Johns Hopkins University

"Critical excitation spectra of a 1D ferromagnetic Ising chain in transverse magnetic field"

In this talk I will review our recent work using low frequency (THz) range radiation to look at interacting quantum spin systems. I will review our work on systems as diverse as multiferroic HoMnO3 and the spin liquid candidate YbMgGaO4. However, I will send most of the talk considering the material system CoNb2O6 that is perhaps the best example of 1D Ising spin system. The 1D Ising model is a foundation of both classical and quantum statistical mechanics and has fundamentally impacted our understanding of thermodynamics, critical phenomena, and conformal field theories. Despite the extensive theoretical impact of the 1D Ising model, until recently there have been very few good realizations of it in actual materials systems. I will present our extensive investigation of CoNb2O6 in transverse magnetic field through the transverse field critical point. This material is perhaps our most ideal realization of a one dimensional ferromagnetic Ising chain. Scaling of the spectra on both sides of the transition provides direct evidence for the free (Majorana) fermion description of the low energy magnetic degrees of freedom of this system.