

Chez Pierre

Presents ...

Monday, October 30, 2017

12:00pm Noon

MIT Room 4-331

Chez Pierre Seminar

Bruce Gaulin - McMaster University

“Ground State Selection in Quantum XY Pyrochlore Magnets”

The pyrochlore lattice, a network of corner-sharing tetrahedra, is one of the most pervasive crystalline architectures in nature that supports geometrical frustration. We and others have been interested in a family of rare earth pyrochlore magnets with local XY anisotropy, that can display quantum $S=1/2$ magnetism on such a lattice. I will discuss up to three such magnets, $\text{Yb}_2\text{Ti}_2\text{O}_7$, $\text{Er}_2\text{Ti}_2\text{O}_7$ and $\text{Er}_2\text{Pt}_2\text{O}_7$. $\text{Yb}_2\text{Ti}_2\text{O}_7$ has been discussed as a "quantum spin ice" candidate ground state system; $\text{Er}_2\text{Ti}_2\text{O}_7$ displays a non-collinear Neel state at low temperature, selected by an order-by-disorder mechanism, while $\text{Er}_2\text{Pt}_2\text{O}_7$ displays a novel "Palmer Chalker" state at low temperatures. I will emphasize neutron scattering studies that we have carried out, and briefly discuss how their ground state selection can be understood in terms of anisotropic exchange on the pyrochlore lattice.

