"Ground State Selection in Quantum 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, Yb2Ti2O7, Er2Ti2O7 and Er2Pt2O7. Yb2Ti2O7 has been discussed as a "quantum spin ice" candidate ground state system; Er2Ti2O7 displays a non-collinear Neel state at low temperature, selected by an order-by-disorder mechanism, while Er2Pt2O7 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.

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