

Chez Pierre

Presents ...

Monday, December 5, 2016

12:00pm Noon

MIT Room 4-331

Chez Pierre Seminar



Martin Mourigal – Georgia Institute of Technology

“Novel spin-liquids in triangular and kagome rare-earth magnets”

Insulating magnets combining the effects of geometrical frustration with strong spin-orbit coupling offer a prime route to realize correlated quantum states with exotic ground-states and excitations. Spin-space anisotropy and bond-directional magnetic exchange interactions are naturally present in rare-earth oxides. One of the most celebrated consequence is the existence of classical and quantum “spin-ice” physics in rare-earth pyrochlores, materials in which magnetic ions occupy a three-dimensional network of corner-sharing tetrahedra. In this talk, I will present the discovery of distinct flavors of exotic magnetic matter in families of rare-earth oxides with two-dimensional kagome [1] and triangular [2] geometries. This experimental work relies on recent advances in materials synthesis and combines thermodynamic characterization with state-of-the-art neutron scattering experiments to unravel the classical or quantum nature of these newly discovered two-dimensional spin-liquids.

[1] *Emergent order in the kagome Ising magnet* $\text{Dy}_3\text{Mg}_2\text{Sb}_3\text{O}_{14}$, J. A. M. Paddison, H. S. Ong, J. O. Hamp, P. Mukherjee, X. Bai, M. G. Tucker, N. P. Butch, C. Castelnovo, M. Mourigal, and S. E. Dutton, *Nature Communications* (In press, 2016). arXiv:1605.01423.

[2] Continuous excitations of the triangular-lattice quantum spin liquid YbMgGaO_4 , J. A. M. Paddison, M. Daum, Z. L. Dun, G. Ehlers, Y. Liu, M. B. Stone, H. D. Zhou, and M. Mourigal, *Nature Physics* (In press, 2016). arXiv:1607.03231.