

**CMP Seminar**  
**Michigan State University**

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Research**

**Has Compelling Experimental Evidence for Order-by-Disorder at Last Been Found  
in a Frustrated Magnetic Material?**

In some magnetic systems, known as frustrated magnets, the lattice geometry or the competition between different spin-spin interactions can lead to a sub-exponentially large number of accidentally degenerate classical ground states. Order-by-disorder (ObD) is a concept of central importance in the field of frustrated magnetism. Saddled with large accidental degeneracies, a subset of states, those that support the largest quantum and/or thermal fluctuations, may be selected to form true long-range order. ObD has been discussed extensively on the theoretical front for over 30 years and proposed to be at play in a number of experimental settings. Unfortunately, convincing demonstrations of OBD in real materials have remained scarce. In this talk, I will review the phenomena of thermal and quantum of order-by-disorder and discuss how recent studies suggest that there may exist compelling evidence for ObD in some frustrated XY pyrochlore antiferromagnetic materials.

**Monday, April 25, 2016**  
**4:10 p.m.**  
**BPS 1400**  
**Prof. Xianglin Ke - Host**