



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

物理学术报告

Physics Seminars (biweekly)

- Title:** Non-equilibrium control of the effective free energy landscape in a frustrated magnet
- Speaker:** Yuan Wan
Institute of Physics, Chinese Academy of Sciences
- Time:** 4:00pm, Tuesday, April 9, 2019
(3:30~4:00pm, Tea and Coffee)
- Venue:** Conference Hall 322, Science Building, Tsinghua University

Abstract

Geometrically frustrated magnets often possess accidentally degenerate ground states at zero temperature. At low temperature, thermal fluctuations lift the accidental degeneracy and tend to stabilize ground states with maximal entropy. This phenomenon, known as “order by disorder”, underlines the fluctuation contribution to the free energy landscape in frustrated magnets.

In this talk, I show that one can control such free energy landscape in a non-equilibrium setting. In a frustrated magnet with precessional dynamics, the system’s slow drift motion within the degenerate ground state manifold is governed by the fast modes out of the manifold. Exciting these fast modes generates a tuneable effective free energy landscape with minima located at thermodynamically unstable portions of the ground state manifold. I demonstrate this phenomenon on pyrochlore XY antiferromagnet, where a magnetic field pulse is sufficient for controlling the effective free energy landscape at nonequilibrium.