



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

学术报告

- Title:** Existence of featureless paramagnets on the square and the honeycomb lattices in 2+1 dimensions
- Speaker:** Chao-Ming Jian 简超明
Stanford University
- Time:** 3:30pm, Tuesday, July 5, 2016
- Venue:** Conference Hall 322, Science Building, Tsinghua University

Abstract

The peculiar features of quantum magnetism sometimes forbid the existence of gapped “featureless” paramagnets which are fully symmetric and unfractionalized. The Lieb-Schultz-Mattis theorem is an example of such a constraint, but it is not known what the most general restriction might be. We focus on the existence of featureless paramagnets on the spin-1 square lattice and the spin-1 and spin-1/2 honeycomb lattice with spin rotation and space group symmetries in 2+1 dimensions. Although featureless paramagnet phases are not ruled out by any existing theorem, field theoretic arguments disfavor their existence. Nevertheless, by generalizing the construction of Affleck, Kennedy, Lieb, and Tasaki to a class we call “slave-spin” states, we propose featureless wave functions for these models. We will provide numerical evidence for the featurelessness of these slave-spin states on the square and honeycomb lattices.