



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: Exotic Spin Excitations of Quantum Magnets

Speaker: Jinsheng Wen (温锦生)
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Time: 4:00pm, Tuesday, April 16, 2019
(3:30~4:00pm, Tea and Coffee)

Venue: Conference Hall 322, Science Building, Tsinghua University

Abstract

Quantum spin liquids (QSLs) represent a novel state of matter in which no spontaneous symmetry is broken and the spins remain in the liquid-like state even at absolute zero temperature. They hold great potentials in quantum computation and communication. Furthermore, it is believed that the understanding of QSLs may help solve the long-term puzzle of high-temperature superconductivity. For these reasons, QSLs have been studied extensively in the past 45 years, but so far there still appear to be no ideal QSL materials.

In this talk, I will present our results on two types of QSL candidates, geometrically-frustrated compounds YbMgGaO₄ and YbZnGaO₄ with the triangular lattice, and a Kitaev material alpha-RuCl₃ with the honeycomb lattice. For both YbMgGaO₄ and YbZnGaO₄, we find that their true ground states to be spin glasses, and disorder is mainly responsible for the spin-liquid-like observations [1]. For alpha-RuCl₃, we show that there is a dominant Kitaev interaction in the zigzag order state [2], and a magnetic field can drive the system from an ordered state into a possible QSL state [3,4].

In the end, I will also briefly discuss our recent discovery of topological magnons in a three-dimensional antiferromagnet Cu₃TeO₆ [5].

References:

- 1, Phys. Rev. Lett. 120, 087201 (2018).
- 2, Phys. Rev. Lett. 118, 107203 (2017).
- 3, Phys. Rev. Lett. 119, 227208 (2017).
- 4, Phys. Rev. Lett. 120, 067202 (2018).
- 5, Nature Commun. 9, 2591 (2018).

报告人简介:

南京大学物理学院教授、博导，国家优秀青年基金、江苏杰出青年基金获得者。2005年清华大学本科毕业；2010年纽约州立大学石溪分校博士毕业；2010年至2012年加州大学伯克利分校博士后；2013年被聘为南京大学教授、博导。长期从事电子强关联材料，特别是铜、铁基等高温超导材料、量子自旋液体与拓扑量子材料的单晶生长及中子散射研究。已在Science、Nature及其子刊、PRL等学术期刊发表论文100多篇，总引用次数3000多次。