International Center for Quantum Materials

Seminar

Topological Kondo insulators and Topological Crystalline Kondo Insulator

Kai Sun

University of Michigan, Ann Arbor

- **Time: 4:00pm, June. 18, 2015 (Thursday)**
- **时间：2015年06月18日（周四）下午4:00**
- **Venue: Room W563, Physics Building , Peking University**
- **地点：北京大学物理楼 西563**

Abstract

In the study of strongly-correlated insulators, a long-standing puzzle remained open for over 40 years. Some Kondo insulators (or mixed-valent insulators) display strange electrical transport that cannot be understood if one assumes that it is governed by the three-dimensional bulk. In this talk, I show that some 3D Kondo insulators have the right ingredients to be topological insulators, which we called “topological Kondo insulators”. For a topological Kondo insulator, the low-temperature transport is dominated by the 2D surface rather than the 3D bulk, because the bulk of this material is an insulator while its surface is a topologically-protected 2D metal. This theoretical picture offers a natural explanation for the long-standing puzzle mentioned above. In addition, we also find that Kondo insulators can support another type of nontrivial topological structure protected by lattice symmetries, which we called “topological crystalline Kondo insulators”. In particular, we predict that SmB$_6$ is both a topological Kondo insulator and a topological crystalline Kondo insulator and I will also discuss recent experiments, which reveal the surface states in SmB$_6$.

About the speaker

Professor Kai Sun received B.S. from School of Physics, Peking University in 2002, and received his Ph.D. degree from University of Illinois at Urbana-Champaign in 2009. From 2009-2012, he worked as a postdoctoral Fellow at Joint Quantum Institute, University of Maryland, College Park. Starting from 20012 he joined the University of Michigan as an assistant professor. Prof. Sun is an important theoretical expert in the field of topological materials. He has published lots of papers in PRL, Nature Physics, and Nature Communications, etc., and made key contributions to the topics of topological flat bands and topological Kondo insulators.