



Seminar

Theoretically Tracing Topological States: from crystals to quasicrystals and to amorphous systems

Dr. Huaqing Huang

University of Utah

Time: 10: 00 am, June. 10, 2019 (Monday)

时间: 2019年6月10日 (周一) 上午10:00

Venue: Room W563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

Since the remarkable discovery of topological insulators, the electronic-structure topology of quantum materials has emerged as a new frontier in modern condensed matter physics and material science. Novel macroscopic quantum phenomena of topological materials are not only of fundamental interest, but may hold some potential for technological applications. In this talk, I will briefly introduce several works about novel topological states (including various topological insulators and semimetals) in crystalline materials, some of which have already experimental verified. And I will also discuss the materials engineering of controlling topological phase transition (TPT) in topological materials. Then, I will expand the horizon of topological states to a new territory, the quasicrystals, and define a new topological invariant, the spin Bott index, to identify nontrivial topology in aperiodic and amorphous systems. Finally, I develop a unified view of TPTs in solids by devising a general topological band theory that underlines a universal linear scaling of TPTs in crystalline, quasicrystalline and amorphous systems.

About the speaker

Huaqing Huang received his B.S. in *mathematics and physics*, and Ph.D. in *condensed matter physics* from Tsinghua University in 2011 and 2016, respectively. After that, he becomes a postdoctoral research associate at the University of Utah. Dr. Huang's current research interests include but are not limited to topological states and phase transitions in periodic (crystals) and nonperiodic systems (e.g., quasicrystals, and amorphous systems); prediction and materials engineering of condensed matter; and the development of method for electronic structure calculations. Dr. Huang has published over 42 articles in scientific journals (e.g. PRL, Nano Lett. and Nature Commun.) with more than 1300 citations and has a Web of Science *h*-index of 17. He is a winner of *National Scholarship for graduate student* awarded by Ministry of Education of China in 2013 and 2015. He was elected as the *Excellent doctoral graduate* in Tsinghua University, and was awarded the *Yu-Hsun Woo* prize in 2016.