# 武汉物数所理论交叉学术交流系列报告

**(第一八八期)**

# Dynamical classification of topological quantum phases


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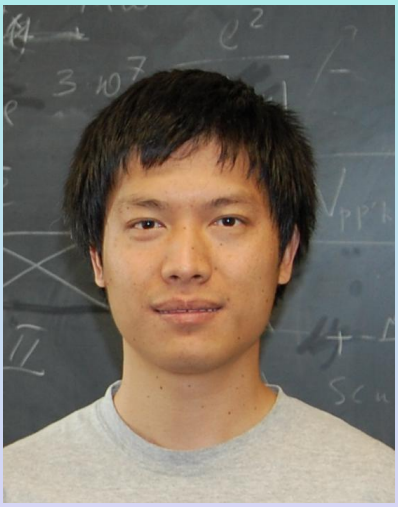
**磁共振楼10楼1016-17报告厅**



**报告人简介:**

刘雄军教授2007至2011年在德州A&M大学取得博士学位。之后于2011至2014年先后在马里兰大学联合量子研究所及凝聚态理论中心，香港科大高等研究院和麻省理工学院物理系从事博士后研究。2014年9月加入北大量子材料中心，国家青年千人。他的主要研究包括凝聚态理论和超冷原子物理，集中于拓扑量子物相，人工规范场量子模拟，强关联拓扑物态等。目前发表论文约50篇，主要发表在Science, Science子刊，Nature子刊，PRX，PRL等期刊上。


**Abstract:**

Topological phase of matter is now a mainstream of research in condensed matter physics, of which the classification, synthesis, and detection of topological states have brought many excitements over the recent decade while remain incomplete with ongoing challenges in both theory and experiment. In this talk I present a universal dynamical characterization of the topological quantum phases classified by integers, which was proposed very recently in our work. The framework of the present study consists of basic theorems. First, we uncover that classifying a generic d-dimensional (dD) gapped topological phase can reduce to a (d-1)D invariant defined on so-called band inversion surfaces (BISs), rendering a fundamental bulk-surface duality. Further, we show in quenching across phase boundary the (pseudo)spin dynamics to exhibit unique topological patterns on BISs, which are attributed to the post-quench bulk topology and manifest a dynamical bulk-surface correspondence. The topological phase is then classified by a dynamical topological invariant measured from dynamical spin-texture field on the BISs. Applications to quenching experiments on feasible models are proposed and studied. The future interesting issues will be discussed.


**Reference:**


L. Zhang, L. Zhang, S. Niu, and X.-J. Liu, Dynamical classification of topological quantum phases, arXiv: 1802.10061.


主办单位:武汉物数所理论与交叉研究部