

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: Topology and Geometry of the Quantum Hall Effect

Speaker: Prof. Xin Wan

Department of Physics, Zhejiang University

Time: 3:15pm, Wednesday, Dec. 19, 2012
(2:45~3:15pm, Tea, Coffee, and Cookie)

Venue: Conference Hall 322, Science Building, Tsinghua University

Abstract: In this talk I will review some of the topological aspects of the quantum Hall effect, including topological Chern numbers, gapless edge excitations, gapped bulk quasiparticles with fractional charge, fractional and possibly non-Abelian statistics, and nontrivial entanglement spectra. I will also discuss some recent experiments and theoretical understandings on the filling factor $5/2$ state, which is believed to be the Moore-Read state or its particle-hole conjugate. In the second part I will explain how one can introduce a family of wavefunctions with identical topological characteristics, but with different geometrical information, encoded in the so-called guiding-center metric, which was proposed by Haldane [Phys. Rev. Lett. 107, 116801 (2011)] for quantum Hall systems with anisotropic mass or interaction. The quantification of the guiding-center metric and the breakdown of the anisotropic FQH state will be presented.

万歆，1995年复旦大学物理系本科毕业，2000年美国普林斯顿大学电子工程系博士。2000年至2003年间在美国国家高磁场实验室凝聚态理论组从事博士后研究。2003年至2005年作为科研职员在德国卡尔斯鲁研究中心纳米技术所工作。2005年5月回国担任浙江大学教授，加入浙江近代物理中心。研究领域是凝聚态物理理论，主要研究兴趣在无序和相互作用的量子体系，包括量子霍尔效应及一些其他强关联系统。近来工作集中在分数量子霍尔效应和拓扑量子计算。