



THURSDAY COLLOQUIUM

Department of Physics, Tsinghua University
<http://www.phys.tsinghua.edu.cn/Colloquium/>

Title Berry phase effects on charge and spin transport

Speaker 牛谦 教授

The University of Texas at Austin

Venue ZhengYu-Tong Lecture Hall

&Date 16:00, April 28, 2011

Abstract:

Ever since its discovery, the notion of Berry phase has permeated through all branches of physics. Over the last three decades, it was gradually realized that the Berry phase of the electronic wave function can have a profound effect on material properties and is responsible for a spectrum of phenomena, such as polarization, orbital magnetism, various (quantum/anomalous/spin) Hall effects, and quantum charge pumping. This is revealed most clearly in the semiclassical formulation of electron dynamics, which is a versatile tool in the study of electron dynamics in the presence of electromagnetic fields and more general perturbations. I will also demonstrate a re-quantization method that converts a semiclassical theory to an effective quantum theory. It is clear that the Berry phase should be added as an essential ingredient to our understanding of basic material properties.

Introduction to the Speaker



牛谦教授1981年毕业于北京大学物理系，是CUSPEA第一届成员，1981年至1985年在美国华盛顿大学留学，先后获得硕士、博士学位，曾在伊利诺斯大学作博士后研究，于1990年到德克萨斯州立大学奥斯汀分校物理系工作至今，为终身教授。现任美国物理学会会员，《现代物理快报B》、《中国物理》等杂志海外编辑，是中科院物理研究所顾问委员会成员，中科院国际量子结构中心的发起人和组织者。主要研究方向为量子输运、Berry相、自旋霍尔效应、光晶格中的超冷原子、半导体的自旋电子学等。发表SCI收录论文近200篇，其中包括Science, Nature, Phys, Phys.Rev.Letts.等，论文被引用超过3500次，有多篇论文单篇引用次数超过百次，在国内外学术会议上作邀请报告160多次。近年来，牛谦教授在超冷原子中、自旋电子学以及将几何相位引入到凝聚态物理中等方面做出了重要的工作，已经成为国际上著名的物理学家。他在量子论、凝聚态物理等方面具有很深的造诣，在相关的研究领域引领世界科学研究的潮流，是为数不多的、活跃在前沿物理研究中的杰出华人科学家代表。