



Institute for Advanced Study, Tsinghua University

Title: Spin Chern Pumping Effect in Topological Insulators

Speaker: Prof. Li Sheng 盛利
(*Nanjing University*)

Time: 3:15pm, Friday, April 18, 2014

Venue: Conference Hall 322, Science Building, Tsinghua University

Abstract

Topological insulators (TIs) are a new quantum state of matter discovered recently, which are characterized by unconventional bulk topological invariants: either the Z_2 index or spin Chern numbers. Unlike the first Chern number underlying the quantum Hall effect, up to now these topological invariants have not been directly measurable. Here we report the theoretical discovery of the spin Chern pumping effect, in a two-dimensional TI electrically modulated in adiabatic cycles. In each cycle an amount of spin proportional to the sample width can be pumped into a nonmagnetic electrode, driven by nonzero spin Chern numbers C . Especially, by using a half-metallic electrode, universal quantized charge pumping conductivities $-C e^2/h$ can be measured. This discovery paves the way for direct experimental study and utilization of the robust topological properties of the TIs.