

清华大学高等研究院

Title:	Physics of Spin Hall Effect
Speaker:	Prof. Guang-Yu Guo (Department of Physics, National Taiwan University)
Time:	3:15pm, Wednesday, September 11, 2013 (2:45~3:15pm, Tea, Coffee, and Cookie)

Venue: Conference Hall 322, Science Building, Tsinghua University

Abstract

Spin Hall effect (SHE) refers to the generation of transverse spin current in a solid by an electric field. Spin current generation is an important issue in the emerging spintronic technology. Thus, SHE has recently attracted considerable interest both theoretically and experimentally since the theoretical proposals of the intrinsic SHE [1-2]. In this talk, I will first give an introduction to SHE, and then describe ab initio band theoretical approaches to the various issues in the field of SHE, in particular, Berry phase theory and ab initio relativistic band structure method [3,4]. This will be followed by a review on our recent relativistic band theoretical studies on the intrinsic SHE in Pt, AI [4], Pd, Au [5] and Mo. In particular, our ab initio calculations revealed that the resonant contribution from the spin-orbit splitting of the doubly degenerated d bands near the Fermi level gives rise to a large intrinsic spin Hall conductivity in Pt and Pd.

Furthermore, our electronic structure calculations for various transition metal impurities in gold indicated possible orbital-dependent Kondo effect in Fe impurity in Au [6]. Thus, the gigantic SHE observed recently in FePt/Au system [7]