



## ICQM Seminar

# Full Band Engineering towards Topological State with Simultaneous Nonzero Charge and Spin Chern Numbers



Xiao HU

International Center for Materials  
Nanoarchitectonics (WPI-MANA), NIMS, Japan

Time: 2:00pm, March. 14, 2013 (Thursday)

时间: 2013年3月14日 (周四) 下午2:00

Venue: Room 607, Science Building 5

地点: 理科五号楼607会议室

### Abstract

We formulate explicitly a scheme to achieve a novel topological state by using staggered electric potential, antiferromagnetic exchange field and spin-orbit coupling to control the spin, valley and sublattice degrees of freedom of electrons. With first principles calculation we demonstrate that the scheme can be realized by material modification in perovskite G-type antiferromagnetic insulators grown along [111] direction, where d electrons hop on a buckled honeycomb lattice. This novel state is ideal for spintronic applications, since it provides a quantized edge current with full spin polarization tunable by inverting electric field, robust to defects, both nonmagnetic and magnetic, and stable at high temperature.

This work is based on collaboration with Dr. Q. F. Liang and Mr. L. -H. Wu.

### About the Speaker

Xiao HU had studied in Peking University. He got his Bachelor's Degree, Master's Degree and Doctor's Degree in University of Tokyo. From June 2006 to 2010, he was a member of "International Team on Superconductivity and Novel Electronic system", Chinese Academy of Science. Since April 2007, he has been a professor in Graduate School of Pure and Applied Science, University of Tsukuba. Since Jan. 2011, he has joined in 1000 Plan (Nanjing University). He has published over 180 papers and given 80 invited talks.