



# 复旦大学物理系物质科学报告

## Topological Matters

### In Electron-Hole Double-layers

## Physics Department Colloquium

**Prof. Ruirui Du**

**Peking University/Rice University**

This talk will illustrate experimental examples of topological matters hosted in a semiconductor double-layer, made by molecular beam epitaxy of InAs and GaSb. The first is the quantum spin Hall insulator which supports time-reversal symmetry protected helical edge modes. We show that the 1D mode in this system is strongly interacting, and may be described by helical Luttinger liquid model. The second is the exciton insulator. It was proposed that exciton condensation and superfluid could be achieved in electron-hole double-layers, but until recently experimental confirmations remained elusive. We will report transport and optical evidences for the exciton insulator found in the bulk of dilute InAs/GaSb. This system shows a great promise to become a new playground for quantum many-body physics.



Prof. Du is an experimental condensed matter physicist who is interested in low temperature physics, semiconductor physics, and the fractional quantum Hall effect. He studied in Fudan University and U. of Illinois at Urbana-Champaign. After receiving a Ph. D in 1990, he was a joint postdoctoral research fellow in Princeton and Bell Labs in 1990-1994, a professor in U. of Utah in 1994-2004 and subsequently in Rice University. He is presently a Chair Professor and director of ICQM at Peking University. He is a recipient of a number of awards including the Alfred Sloan Research Fellow, OCPA Researcher Award, and APS Fellow.

**Time: 2:00pm, Tuesday, 2016.04.26**

**Location: Physics Building, Room 221B**

**(Cookies and coffee are served from 1:30 pm)**