



The Abdus Salam  
International Centre for Theoretical Physics



## Fifth Stig Lundqvist Conference on the Advancing Frontiers of Condensed Matter Physics

Cosponsor(s): ICAM-12CAM Institute for Complex Adaptive Matter, Davis, CA, USA  
Organizer(s): Directors: Gene Mele, Aron Pinczuk; Erio Tosatti (Local Organiser)  
Trieste - Italy, 11 - 15 July 2011

**Venue: Adriatico Guest House Kastler Lecture Hall**

### Programme

**Monday 11 July 2011** (Room: Adriatico Guest House Kastler Lecture Hall)

**11 July 2011**

**09:00 - 10:45** (Room: Adriatico Guest House - Kastler Lecture Hall Area (Lower Level 1))  
**Registration**

**10:15 - 10:45** --- Coffee break ---

**10:45 - 11:00** **Erio TOSATTI, Aron PINCZUK, Gene MELE**  
**Welcome and opening remarks**

**Topological Insulators: Overview**

**11 July 2011**

**11:00 - 12:00** **Joel MOORE** / *Department of Physics, University of California, Berkeley, USA*  
**Topological insulators: Magnetotransport and magnetoelectric effects in solids**

**12:00 - 14:00** --- Lunch Break ---

## Topological Phases I

11 July 2011

- 14:00 - 15:00**     **David VANDERBILT** / *Department of Physics, Rutgers University, Piscataway, USA*  
**Orbital magnetoelectric effects and topological insulators**
- 15:00 - 16:00**     **Marcel FRANZ** / *Department of Physics, University of British Columbia, Vancouver, Canada*  
**Engineering a room-temperature spin Hall state in graphene via adatom deposition**
- 16:00 - 16:30**     (Room: Adriatico Guest House (Terrace))  
--- Coffee Break ---
- 16:30 - 17:30**     **Jay SAU** / *Department of Physics, University of Maryland, College Park, USA*  
**Majorana fermions, Non-abelian statistics and topological quantum computation in semiconductor/superconductor heterostructures**
- 17:30 - 18:30**     **Maxim DZERO** / *Department of Physics, Kent State University, Kent, USA*  
**Topological Kondo insulators**
- 19:00 - 21:00**     (Room: Adriatico Guest House (Terrace))  
--- WELCOME RECEPTION ---

Tuesday 12 July 2011 -

**Topological Phases II** (Room:Adriatico Guest House Kastler Lecture Hall)

12 July 2011

- 09:00 - 10:00**     **Jainendra JAIN** / *Department of Physics, Penn State University, USA*  
**5/2 FQHE: Unpaired composite fermion, topological exciton, and zero mode**
- 10:00 - 11:00**     **Zahid HASAN** / *Department of Physics, Princeton University, Princeton, USA*  
**Topological Surface States, 3D topological insulators and Platforms for Majorana Fermions**
- 11:00 - 11:30**     (Room: Adriatico Guest House (Terrace))  
--- Coffee Break ---
- 11:30 - 12:30**     **Massimo INGUSCIO** / *LENS, Universita' di Firenze, Sesto Fiorentino, Italy*  
**Quantum phases of atoms in optical lattices**
- 12:30 - 14:30**     --- Lunch Break ---
- 14:30 - 15:30**     **Adiel STERN** / *CMP, Weizmann Institute, Rehovot, Israel*  
**Manipulating majorana fermions in one and two dimensions**
- 15:30 - 16:30**     **Cristiane MORAIS SMITH** / *Department of Theoretical Physics. Universty of Utrecht, The Netherlands*  
**Topological phases and phase transitions in honeycomb fermionic lattices: Spin-imbalanced QHE, spin textures and merging of Dirac points**
- 16:30 - 17:00**     (Room: Adriatico Guest House (Terrace))  
--- Coffee Break ---
- 17:00 - 18:00**     **Yong Baek KIM** / *Department of Physics, University of Toronto, Toronto, Canada*  
**Quantum spin liquid: Current status**

Wednesday 13 July 2011

**Topology and Graphene (Room:Adriatico Guest House Kastler Lecture Hall)**

13 July 2011

- 09:00 - 10:00     **Mikhail KATSNELSON** / *Radboud University, Nijmegen, The Netherlands*  
**Graphene: CERN on the desk**
- 10:00 - 11:00     **Vittorio PELLEGRINI** / *NEST & Scuola Normale Superiore di Pisa, Italy*  
**Hubbard-Mott physics of electrons in an artificial semiconductor lattice**
- 11:00 - 11:30     (Room: Adriatico Guest House (Terrace))  
--- Coffee Break ---
- 11:30 - 12:30     **Ali YAZDANI** / *Department of Physics, Princeton University, Princeton, USA*  
**Helical metals on the surfaces of topological insulators**
- 12:30 - 14:30     --- Lunch Break ---

**Topological Phases III**

13 July 2011

- 14:30 - 15:30     **Xi DAI** / *Beijing National Laboratory, CMP & Institute of Physics, Beijing, P.R. China*  
**Z<sub>2</sub> Topological invariant for band insulators and non-Abelian Berry,  $\mathbb{A}^1$  connection**
- 15:30 - 16:30     **Sankar DAS SARMA** / *Department of Physics, University of Maryland, College Park, USA*  
**Topological superconductivity and non-Abelian Majorana particles in generic semiconductor heterostructures**
- 16:30 - 17:30     (Room: Adriatico Guest House - Kastler Lecture Hall Area (Lower Level 1))  
--- Poster Session ---

**Thursday 14 July 2011 - Observing Topological Phases (Room:Adriatico Guest House Kastler Lecture Hall)**

14 July 2011

- 09:00 - 10:00     **Laurens MOLENKAMP** / *Physics Institute, EP3, University of Wuerzburg, Germany*  
**Dirac fermions in HgTe quantum wells**
- 10:00 - 11:00     **Nuh GEDIK** / *MIT, Cambridge, USA*  
**Ultrafast probing of dynamical spin-charge coupling in topological insulators**
- 11:00 - 11:30     (Room: Adriatico Guest House (Terrace))  
--- Coffee Break ---
- 11:30 - 12:30     **Robert WILLETT** / *Bell Lab., Lucent Technologies, Murray Hill, USA*  
**Evidence for non-Abelian excitations at 5/2 filling factor**
- 12:30 - 14:30     --- Lunch Break ---

- 14:30 - 15:30**     **Shafique ADAM / NIST, Gaithersburg, USA**  
**Graphene: Revisiting old questions in a new material**
- 15:30 - 16:30**     **Steve SIMON / Rudolf Peierls Centre, Oxford University, Oxford, UK**  
**Comments and Outlook on Recent quantum Hall interferometry experiments**
- 16:30 - 17:00**     (Room: Adriatico Guest House (Terrace))  
--- Coffee Break ---
- 17:00 - 18:00**     **Andreas SCHNYDER / MPI Solid State Research, Stuttgart, Germany**  
**Topological phases in three-dimensional superconductors**
- 18:00 - 18:30**     **Final Remarks**

**Friday 15 July 2011**

**15 July 2011**

**09:00 - 12:00**     --- UNSTRUCTURED LOCAL ACADEMIC AND CULTURAL PURSUITS ---