

Nobel Symposium 156

New forms of matter: topological insulators and superconductors

Scientific Program

Högberga Gård, Lidingö
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Friday morning, June 13 – Topological Insulators I

- 09:00 - 09:15 Opening address
09:15 - 10:00 M.Z. Hasan (Princeton University, USA)
Topological Insulators: A New Form of Quantum Matter
10:00 - 10:30 L. Molenkamp (Würzburg University, Germany)
HgTe, a Topological Insulator in 2 and 3 Dimensions
10:30 - 11:00 Coffee break
11:00 - 11:30 Q.-K. Xue (Tsinghua University, China)
Experimental realization of quantum anomalous Hall effect
11:30 - 12:00 S.C. Zhang (Stanford University, USA)
Topological insulators and topological superconductors
12:00 - 12:30 L. Fu (Massachusetts Institute of Technology, USA)
Topological crystalline insulators

Friday afternoon, June 13 – Topological Insulators II

- 14:00 - 14:45 E.J. Mele (University of Pennsylvania, Philadelphia, USA)
The winding road to topological insulators
14:45 - 15:15 T. Neupert (Princeton University, USA)
Fractional Chern Insulators
15:15 - 15:45 Coffee break
15:45 - 16:15 C. Chamon (Boston University, USA)
Fractional Topological Insulators
16:15 - 16:45 A. Altland (University of Cologne, Germany)
Quantum criticality of the one dimensional topological Anderson insulator
16:45 - 17:00 Short break
17:00 - 17:30 A. Stern (Weizmann Institute of Science, Israel)
Non-abelian physics between one and two dimensions

Saturday morning, June 14 – One-dimensional systems and Majorana fermions I

- 09:00 - 09:45 J. Alicea (California Institute of Technology, USA)
Majorana Materializes
09:45 - 10:15 C.W.J. Beenakker (Leiden University, The Netherlands)
Super-Ohmic conduction of edge modes in topological insulators and superconductors
10:15 - 10:45 Coffee break
10:45 - 11:15 F. von Oppen (Free University Berlin, Germany)
Topological superconducting phase in helical Shiba chains
11:15 - 11:45 M. Heiblum (Weizmann Institute of Science, Israel)
Proliferation of neutral modes in fractional quantum Hall states
11:45 - 12:15 H.Q. Xu (Lund University, Sweden)
Majorana fermions in topological superconductor nanowires

Saturday afternoon, June 14 – General Theory

- 14:00 - 14:45 A.W.W. Ludwig (University of California, Santa Barbara, USA)
Topological Phases: Classification of non-interacting topological insulators and superconductors, and beyond
- 14:45 - 15:15 F.D.M. Haldane (Princeton University, USA)
“Quantum Geometry” and Topological Insulators
- 15:15 - 15:45 Coffee break
- 15:45 - 16:15 T. Hughes (University of Illinois, Urbana-Champaign, USA)
Interplay between Symmetry and Geometry in Topological Phases
- 16:15 - 16:45 S. Ryu (University of Illinois, Urbana-Champaign, USA)
Generalized Laughlin’s argument for symmetry protected topological phases
- 16:45 - 17:00 Short break
- 17:00 - 17:30 M.R. Zirnbauer (University of Cologne, Germany)
Bott periodicity for Z_2 symmetric ground states of gapped free-fermion systems with disorder
- 17:30 - 18:00 X.-L. Qi (Stanford University, USA)
Layer construction of three-dimensional topological states

Sunday morning, June 15 – One-dimensional systems and Majorana fermions II

- 09:00 - 09:45 C.M. Marcus (University of Copenhagen, Denmark)
Hard-gap superconductor-semiconductor devices and topological superconductivity
- 09:45 - 10:15 C.L. Kane (University of Pennsylvania, Philadelphia, USA)
Topological Superconductivity and the Fractional Josephson Effect
- 10:15 - 10:45 Coffee break
- 10:45 - 11:15 A. Yazdani (Princeton University, USA)
Visualizing Topological Quantum States: From Dirac edge states to Majorana zero modes
- 11:15 - 11:45 A. Vishwanath (University of California, Berkeley, USA)
Beyond Band Insulators: Weyl semimetals and Strongly Interacting Topological Phases.
- 11:45 - 12:15 S. Das Sarma (University of Maryland, USA)
Has (the) Majorana really returned?

Sunday afternoon, June 15 – Panel session

- 14:00 - 14:30 B.A. Bernevig (Princeton University, USA)
Topological Insulators Without Spin-Orbit Coupling
- 14:30 - 15:00 N. Read (Yale University, USA)
Chiral topological phases and entanglement
- 15:00 - 15:15 Short break
- 15:15 - 15:45 F. Wilczek (Massachusetts Institute of Technology, USA)
Entangled Histories
- 15:45 - 16:15 G.E. Volovik (Aalto University, Finland)
From Standard Model of particle physics to room-temperature superconductivity
- 16:15 - 16:45 Coffee break
- 16:45 - 17:45 *Panel discussion*
- 17:45 - 18:00 Closing remarks