

**Programme on  
“Topological Phases of Quantum Matter”, August 4 - September 12, 2014**

**organized by  
Nicholas Read (Yale U), Jakob Yngvason (U Vienna), Martin Zirnbauer (U Cologne)**

**Schedule of Introductory Lectures:  
August 4 - 8, 2014**

• **Monday, August 4, 2014**

09:00 **Opening & Registration**

09:30 – 10:30 **Markus Morgenstern**

*Topological properties in solids probed by experiment*

10:30 – 11:00 *coffee/tea break*

11:00 – 12:30 **Yosi Avron**

*Platonic quantum Hall effect: Chern number*

12:30 – 14:00 *lunch break*

14:00 – 15:30 **Nicholas Read**

*Topological phases of matter: 1. Quantum Hall effect and Laughlin states*

15:30 – 16:00 *break*

16:00 – 17:30 **Shinsei Ryu**

*Periodic table of topological insulators and superconductors: invariants built from Bloch wave functions*

• **Tuesday, August 5, 2014**

09:00 – 10:30 **Yosi Avron**

*Platonic quantum Hall effect: Fredholm index*

10:30 – 11:00 *coffee/tea break*

11:00 – 12:30 **Jean Bellissard**

*Noncommutative geometry approach to topological invariants in condensed matter physics (I)*

12:30 – 14:00 *lunch break*

14:00 – 15:30 **Shinsei Ryu**

*Periodic table of topological insulators and superconductors: Anderson delocalization at the boundary*

15:30 – 16:00 *break*

16:00 – 17:30 **Nicholas Read**

*Topological phases of matter: 2. Conformal field theory and non-abelian statistics*

- **Wednesday, August 6, 2014**

09:30 – 10:30 **Charles M. Marcus**

*Majorana modes in semiconductor nanowires?*

10:30 – 11:00 *coffee/tea break*

11:00 – 12:30 **Frank Verstraete**

*Classifying topological states using quantum tensor networks (I)*

- **Thursday, August 7, 2014**

09:00 – 10:30 **Jean Bellissard**

*Noncommutative geometry approach to topological invariants in condensed matter physics (II)*

10:30 – 11:00 *coffee/tea break*

11:00 – 12:30 **Frank Verstraete**

*Classifying topological states using quantum tensor networks (II)*

12:30 – 14:00 *lunch break*

14:00 – 15:30 **Nicholas Read**

*Topological phases of matter: 3.  $p+ip$  paired states and Majorana zero modes*

15:30 – 16:00 *break*

16:00 – 17:30 **Shinsei Ryu**

*Periodic table of topological insulators and superconductors:  $K$ -theory; interactions*

- **Friday, August 8, 2014**

09:00 – 10:30 **Jean Bellissard**

*Noncommutative geometry approach to topological invariants in condensed matter physics (III)*

10:30 – 11:00 *coffee/tea break*

11:00 – 12:30 **Frank Verstraete**

*Classifying topological states using quantum tensor networks (III)*

12:30 – 14:00 *lunch break*

14:00 – 15:30 **Xiao-Gang Wen**

*Quantum entanglement, topological order, and tensor category theory (I)*

15:30 – 16:00 *break*

16:00 – 17:30 **Xiao-Gang Wen**

*Quantum entanglement, topological order, and tensor category theory (II)*

**All lectures take place at the ESI, Boltzmann Lecture Hall**

Programme Website: <http://www.esi.ac.at/activities/events/2014/topological-phases-of-quantum-matter>