

**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>