

**Quantum Computation and Quantum Spin Systems****Workshop: August 10–August 14 2009**Erwin Schrödinger International Institute for Mathematical Physics  
Vienna, Austria

Organizers: B. Nachtergaele, B. Terhal, F. Verstraete, R. Werner

**Monday, August 10, 2009**

- 10:00 - 10:05 OPENING
- 10:05 - 10:50 DANIEL GOTTESMAN  
Computational Complexity of Translationally invariant Systems
- 10:50 - 11:15 COFFEE BREAK
- 11:15 - 12:00 DANIEL NAGAJ  
Local Hamiltonians in Quantum Computation
- 12:00 - 15:00 LUNCH BREAK
- 15:00 - 15:45 STEPHEN JORDAN  
QMA-Complete Problems for Stochastic Hamiltonians and Markov Matrices

**Tuesday, August 11, 2009**

- 10:00 - 10:45 PAUL FENDLEY  
Duality and Topological Order
- 10:45 - 11:15 COFFEE BREAK
- 11:15 - 12:00 ZOHAR NUSSINOV  
Duality mappings via bond algebras, their applications to quantum spin systems,  
and implications for quantum information
- 12:00 - 15:00 LUNCH BREAK
- 15:00 - 15:45 SERGEY BRAVYI  
Perturbative expansions based on the Schrieffer-Wolf transformation

**Wednesday, August 12, 2009**

- 10:00 - 10:45 ITAI ARAD  
tba
- 10:45 - 11:15 COFFEE BREAK
- 11:15 - 12:00 DORIT AHARONOV  
tba
- 12:00 - 15:00 LUNCH BREAK
- 15:00 - 15:45 FERNANDO BRANDAO  
The complexity of poly-gapped Hamiltonians.  
Extending Valiant-Vazirani theorem to the probabilistic and quantum settings
- 16:30 - POSTER SESSION

**Thursday, August 13, 2009**

- 10:00 - 10:45 SHIVAJI SONDHI  
Random Quantum Satisfiability
- 10:45 - 11:15 COFFEE BREAK
- 11:15 - 12:00 TOBIAS OSBORNE  
When is a Quantum Spin System Frustrated?
- 12:00 - 15:00 LUNCH BREAK
- 15:00 - 15:45 GUIFRE VIDAL BONAFONT  
Entanglement renormalization in two spatial dimensions:  
frustrated antiferromagnets and interacting fermions

**Friday, August 14, 2009**

- 10:00 - 10:45 DAVID POULIN  
tba
- 10:45 - 11:15 COFFEE BREAK
- 11:15 - 12:00 ROBERT SIMS  
Lieb-Robinson bounds for an-harmonic lattice systems
- 12:00 - 15:00 LUNCH BREAK
- 15:00 - 15:45 LLUIS MASANES MERUELO  
An area law for the entropy of low-energy states

All lectures take place in the ESI Boltzmann Lecture Hall.