Aspen Quantum Winter Conference - Feb 03 - 09, 2019

New Approaches to Strongly Correlated Quantum Systems

Dates: February 03 - 09, 2019

Program (all talks are 30+10 minutes)**:**

Sunday:	Reception (5:00-7:00)					
	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
8:40 - 9:20	Eli Zeldov	Yizhi You	Ulrich Schollwoeck	Fakher Assaad	Masaki Oshikawa	Andriy Nevidomskyy
9:20 - 9:40	**Break**	Danny Bulmash	**Break**	**Break**	**Break**	Sun-Sik Lee
9:40 - 10:20	Dominic Else	**Break**	Norbert Schuch	Assa Auerbach	Itamar Kimchi	**Break**
10:20 - 11:00	Maia Vergniory	Mike Hermele	Roger Mong	Dima Feldman	Yong-Baek Kim	Adam Nahum
11:00 - 11:40		Peter Schauss	**Posters from 11:00**			Andrew Green
11:40 - 4:00	**Break**	**Break**		**Break**	**Break**	**Closing**
4:00 - 4:40	Feng Wang			Cecile Repellin	Lesik Motrunich	
4:40 - 5:20	Adrian Po			Christina Knapp	Yin-Chen He	
5:20 - 5:40	**Break**		Physics Café (4:30-5:30)	**Break**	**Break**	
5:40 - 6:20	Ivar Martin		Public Lecture (5:30-6:30):	Jeongwan Haah	David Poland	
6:20 - 7:00	Cenke Xu		Ulrich Schollwoeck	Bela Bauer	Anders Sandvik	
	Dinners in town	Dinners in town	Dinners in town	Banquet (7:30)	Dinners in town	

→ Program and Abstracts: PDF

Talks:

- **Eli Zeldov**: Nanoscale cryogenic thermal imaging: glimpse into dissipation in 2D quantum systems down to atomic scale
- **Dominic Else**: Three physical pictures for interacting topological crystalline phases
- **Maia Vergniory**: Realization of toplogically protected magnetic fermions in materials
- **Feng Wang**: Engineering Correlated Physics in Two-Dimensional Moire Superlattices
- **Adrian Po**: Modeling twisted bilayer graphene
- **Ivar Martin**: Phonon-induced pairing in twisted bilayer graphene
- **Cenke Xu**: Coupled conformal field theory description of the Correlated Physics on Moire superlattice
- **Yizhi You:** Fracton phase of matter: From gauge theory to Majorana Lego realization
- **Danny Bulmash**:Coupling Fractons to TQFTs: a New Class of non-Abelian Fracton Models
- **Mike Hermele**: Abelian and non-Abelian excitations in fracton phases of matter
- **Peter Schauss:** Quantum gas microscopy of many-body dynamics in Fermi-Hubbard and Ising systems
- **Ulrich Schollwoeck:** Realistic DMFT with Matrix Product State Impurity Solvers
- **Norbert Schuch:** Study of topological spin liquids with projected entangled pair states
- **Roger Mong:** Emergent mode and bound states in single-component fermionic systems
- **Fakher Assaad**: Intertwined orders in Dirac Fermions
- **Assa Auerbach**: Equilibrium Formulae for Transverse Magneto-transport of Strongly Correlated Metals
- **Dima Feldman**: Partial equilibration of integer and fractional edge channels in the thermal quantum Hall effect

- **Cecile Repellin**: Detecting fractional Chern insulators through circular dichroism
- **Christina Knapp**: Fractional Chern insulator edges and layer-resolved lattice contacts
- **Jeongwan Haah**: Nontrivial Quantum Cellular Automata in higher dimensions
- **Bela Bauer**: Topologically protected braiding in a single wire using Floquet Majorana modes
- **Masaki Oshikawa**: Universal gap scaling of finite Ising/Kitaev chains
- **Itamar Kimchi**: Dirty quantum magnets
- **Yong-Baek Kim**: Topological superconductors from quantum spin liquid and topological semimetal
- **Lesik Motrunich**: Ising ferromagnet to valence bond solid transition in a 1d spin chain
- **Yin-Chen He**: Field-induced neutral Fermi surface and QCD3 quantum criticalities in the Kitaev models
- **David Poland**: Bootstrapping 3D CFTs
- **Anders Sandvik**: Analytic continuation of quantum Monte Carlo data: beyond the Maximum Entropy method
- **Andriy Nevidomskyy**: Revealing the Emergent Spinon Fermi Surface of the Critical Spin Liquids
- **Sun-Sik Lee**: State dependent spread of entanglement in relatively local Hamiltonians
- **Adam Nahum**: Emergent symmetry and quasi-universality at critical points in three spacetime dimensions
- **Andrew Green**: The Lyapunov Spectra of Quantum Thermalisation

Conference Synopsis:
Recent years have seen the development of new non-perturbative approaches to the quantum many-body problem arising from surprising interdisciplinary sources. On the numerical side, insights from quantum information theory have led to the discovery of efficient tensor network methods, while machine learning techniques have been adapted to the study of quantum many-body states and the optimization of Monte Carlo sampling. Theoretically, new dualities and the bootstrap program are yielding surprising constraints on quantum critical phases, while quantum information theory has been used to derive bounds on even more general many-body systems. At the same time engineered quantum systems, both in cold atomic systems and the solid state, are providing an unprecedented level of control which is allowing these approaches to be tested in the laboratory. Our winter meeting will attempt to bring together leading practitioners to discuss the further development of these new approaches and their application to outstanding problems in condensed matter physics.

Organizers:
Immanuel Bloch (Max Planck Institute of Quantum Optics)
Xie Chen (Caltech)
Frank Pollmann (Technical University Munich)
Xiao-Liang Qi (Stanford)
Michael Zaletel (UC Berkeley)

List of Invited Speakers:
Fakher Assaad (Universität Würzburg)
Bela Bauer (Station Q)
Jeongwan Haah (Microsoft Research)
Yin-Chen He (Perimeter)
Michael Hermele (University of Colorado Boulder)
Sun-Sik Lee (Perimeter)

Adam Nahum (Oxford)
Masaki Oshikawa (ISSP)
Adrian Po (MIT)
Dave Poland (Yale)
Cecile Repellin (MIT)
Anders Sandvik (Boston University)
Norbert Schuch (MPQ)
Ulrich Schollwoeck (Munich)
Ilani Shahal (Weizmann)
Maia Vergniory (Donostia International Physics Center)
Ashvin Vishwanath (Harvard)
Cenke Xu (UC Santa Barbara)
Eli Zeldov (Weizmann)