KAVLI INSTITUTE FOR THEORETICAL PHYSICS
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KITP Conference: Frontiers of Quantum Information Physics

(Oct 9-13, 2017)

Coordinators: Daniel Harlow, Patrick Hayden, Stephen Jordan, and Brian Swingle
Scientific Advisors: Veronika Hubeny and John Preskill

Monday, Oct 09, 2017

Session: Low Depth Quantum Circuits, Chair: Elizabeth Crosson (Caltech)

8:50am	Lars Bildsten (KITP)	Welcome
9:00am	Dorit Aharonov (Hebrew U)	The era of computational experiments
9:45am	David Gosset (IBM)	Quantum advantage with shallow circuits
10:30am		**Morning Break**
11:00am	Daniel Gottesman (Perimeter)	Fault tolerance in small experiments
11:45am	John Martinis (Google/UCSB)	Quantum supremacy: checking a quantum computer with a classical supercomputer
12:30pm		**Lunch Break**

Session: Tensor Networks and Entanglement Structure, Chair: Fernando Pastawski (Frei UBerlin)

2:00pm	Michael Walter (Stanford)	Rigorous entanglement renormalization from wavelet theory
2:45pm	Guifre Vidal (Perimeter)	Geometric tensor networks for critical quantum spin chains
3:30pm		**Afternoon Break**
4:00pm	Frank Verstraete (Ghent/Vienna)	Fusing tensor networks and TQFTs to CFTs
4:45pm	Umesh Vazirani (Berkeley)	Rigorous renormalization group algorithm for computing low energy states.
5:30pm		**SHUTTLE TO BWSCI**

Tuesday, Oct 10, 2017

Session: Theory Meets Experiment, Chair: Steven Bartlett (U. Sydney)

9:00am	Isaac Kim (IBM)	Noise-resilient quantum circuits
9:45am	Thomas Vidick (Caltech)	A low degree test for quantum states
10:30am		**Morning Break**
11:00am	Ashvin Vishwanath (Harvard)	Entanglement dynamics and topology in driven systems
11:45am	Steven Giddings (UCSB)	Entanglement transfer from black holes via small couplings: basic postulates to soft quantum structure
12:30pm		**Lunch Break**

Session: Spacetime and Entanglement, Chair: Janet Hung (Fudan U)

2:00pm	Xi Dong (UCSB)	Quantum corrections to holographic entanglement
2:45pm	Mark Van Raamsdonk (UBC)	How to discover spacetime and gravity from entanglement structure in conformal field theory
3:30pm		**Afternoon Break**
4:00pm	Matt Headrick (Brandeis)	Bit threads and holographic entanglement

4:45pm	Xiaoliang Qi (Stanford)	Quantum causal influence
5:30pm		**RECEPTION**
6:00pm		**SPECIAL EVENTS DINNER**
8:00pm		**SHUTTLE TO BWSCI**

Wednesday, Oct 11, 2017

Session: Entropy, Chaos, and Scrambling, Chair: Jordan Cotler (Stanford)

9:00am	Vedika Khemani (Harvard)	Entanglement, Tensor Networks and the MBL-ETH transition
9:45am	Tarun Grover (UCSD)	Universal Renyi entropies in chaotic systems
10:30am		**Morning Break**
11:00am	Nicole Yunger-Halpern (KITP)	The skeleton of information scrambling
11:45am	Arghavan Safavi-Naini (JILA)	Measuring out-of-time-order quantum correlations and multiple quantum spectra in a trapped ion quantum magnet
2:00pm		**FREE AFTERNOON-SHUTTLE AVAILABLE TO BWSCI**

Thursday, Oct 12, 2017

Session: Computational Complexity, Chair: Adam Bouland (Berkeley)

9:00am	Edward Farhi (MIT/Google)	What to do with a near-term quantum computer
9:45am	Scott Aaronson (UT Austin)	New results on learnability of quantum states
10:30am		**Morning Break**
11:00am	Leonard Susskind (Stanford)	Gravity and Complexity
11:45am	Misha Lukin (Harvard)	Exploring many-body dynamics in a 51 atom quantum simulator
12:30pm		**Lunch Break**

Session: Black Holes and Geometry, Chair: Eva Silverstein (Stanford)

2:00pm	Alexei Kitaev (Caltech)	Efficient decoding for the Hayden-Preskill protocol
2:45pm	Stephen Shenker (Stanford)	Black holes and random matrices
3:30pm		**Afternoon Break**
4:00pm	Juan Maldacena (IAS)	Traversable wormholes and the black hole interior
4:45pm	Steve Flammia (U. Sydney)	Limits on the reliable storage of quantum information in a volume of space
5:30pm		**RECEPTION**
6:00pm		**SPECIAL EVENTS DINNER**
8:00pm		**SHUTTLE TO BWSCI**

Friday, Oct 13, 2017

Session: Quantum Information Theory, Chair: Robert Koenig (TUM)

9:00am	Debbie Leung (U. Waterloo)	On the quantum and private capacities of quantum channels
9:45am	Roger Colbeck (York)	Entropic constraints on causal structures

10:30am	**Morning Break**	
11:00am	David Poulin (U of Sherbrooke)	Information loss in quantum field theories.
11:45am	Adam Kaufman (U. Colorado)	Studies in entanglement through microscopy of ultracold neutral atoms
12:30pm	**Lunch Break**	

Session: Many-Body Phenomena

2:00pm	Xie Chen (Caltech)	Fracton topological phases
2:30pm	Jeongwan Haah (Microsoft)	Two generalizations of the cubic code model
3:30pm	**CONFERENCE END. SHUTTLE TO BWSCI. Also available to SB Airport and Goleta Airbus & train station (See Registration Desk BEFORE FRIDAY to sign up.)**	