

KAVLI INSTITUTE FOR THEORETICAL PHYSICS
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KITP Conference: Novel Approaches to Quantum Dynamics

(Aug 27-31, 2018)

**Coordinators: Rahul Nandkishore, Siddharth Parameswaran,
 Marcos Rigol and Romain Vasseur**

Monday, Aug 27, 2018

Dynamics of Thermalization, Chair: Rahul Nandkishore (CU Boulder)

8:50am	Mark Bowick (KITP)	Welcome
9:00am	Ehud Altman (UC Berkeley)	Computing quantum thermalization dynamics
9:45am	Ana Maria Rey (JILA/CU Boulder)	Entanglement dynamics and scrambling in a trapped ion magnet
10:30am	Morning Break	
11:00am	Anatoli Polkovnikov (BU)	Phase space approach for simulating emergent hydrodynamics of interacting spin chains
11:45am	Frank Pollmann (TU Munich)	Quantum thermalization dynamics
12:30pm	Lunch Break	

Driven Systems and Quantum Information

2:00pm	Philip Crowley (BU)	Topology and chaos in quasiperiodically driven quantum systems
2:45pm	Mark Rudner (NBI Copenhagen)	Prethermalization and topological transport at quasi-infinite temperature in slowly driven Floquet systems
3:30pm	Afternoon Break	
4:00pm	Hong Liu (MIT)	Scrambling, descrambling and quantum many-body teleportation
4:45pm	Elizabeth Crosson (IQIM Caltech)	Thermal stability in universal adiabatic computation
5:30pm	SHUTTLE TO BWSCI	

Tuesday, Aug 28, 2018**Experimental Probes I Localization and Dynamics**

- 9:00am Misha Lukin (Harvard) Probing many-body dynamics with Rydberg atom arrays
- 9:45am Alex Lukin (Harvard) Probing entanglement in localized systems
- 10:30am **Morning Break**
- 11:00am Paola Cappellaro (MIT) Localization and prethermalization in nuclear spin chains
- 11:45am Ed Grant (UBC) Possible manifestations of quantum disordered dynamics in the arrested relaxation of a molecular ultracold plasma
- 12:30pm **Lunch Break**
- 2:00pm **Ergodicity Breaking in MBL Systems and Beyond**
- 2:00pm Francois Huveneers (Univ of Paris-Dauphine) Critical localization length in MBL systems
- 2:45pm Dmitry Abanin (Univ of Geneva) Non-ergodic phases of matter beyond MBL
- 3:30pm **Afternoon Break**
- 4:00pm Maksym Serbyn (IST Austria) Weak ergodicity breaking from quantum many-body scars
- 4:45pm Vedika Khemani (Harvard) Velocity dependent Lyapunov exponents
- 5:30pm **RECEPTION - KITP COURTYARD**
- 6:00pm **SPECIAL EVENTS DINNER - KITP COURTYARD**
- 8:00pm **SHUTTLE TO BWSCI**

Wednesday, Aug 29, 2018**Experimental Probes II/Quantum Glassiness, Chair: John Chalker (Oxford)**

- 9:00am Tom Rosenbaum (Caltech) Probing many-body localization in a disordered quantum magnet
- 9:45am Benjamin Lev (Stanford) Thermalization near integrability in a dipolar quantum Newton's cradle

10:30am **Morning Break**

11:00am Claudio Chamon (BU) Topological quantum glassiness

11:45am Michael Pretko (CU Boulder) Localization in fractonic random circuits

12:30pm **Lunch Break**

2:00pm **FREE AFTERNOON*Shuttle Available to BWSCI ****

Thursday, Aug 30, 2018

Quantum Chaos and Random Circuits, Chair: Marcos Rigol (Penn State)

9:00am Liang Fu (MIT) Nonlinear and non-Hermitian quantum dynamics in solids and qubits

9:45am Sagar Vijay (MIT/Harvard) Dynamics in quantum circuits

10:30am **Morning Break**

11:00am Tomaz Prosen (Univ of Ljubljana) Many body chaos in Floquet-Ising spin chains: rigorous connection to random matrix theory

11:45am Andrea de Luca (Oxford) Solution of a minimal model for many-body quantum chaos

12:30pm **Lunch Break**

Entanglement, Complexity, and Transport, Chair: Paola Capellaro (MIT)

2:00pm Yi-Zhuang You (UCSD) Entanglement features of random Hamiltonian dynamics

2:45pm Pasquale Calabrese (SISSA) Entanglement and thermodynamics in non-equilibrium isolated quantum systems

3:30pm **Afternoon Break**

4:00pm Shira Chapman (Perimeter) Circuit complexity for thermofield double states

4:45pm Aditi Mitra (NYU) Transport signatures of transient superfluids

5:30pm **RECEPTION-KITP COURTYARD**

6:00pm **SPECIAL EVENTS DINNER- KITP COURTYARD**

8:00pm **SHUTTLE TO BWSCI**

Friday, Aug 31, 2018**Session Chair: Ravin Bhatt (Princeton)**

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| 9:00am Fabian Essler (Oxford) | Full counting statistics after quantum quenches |
| 9:45am Sergio Boixo (Google) | The question of quantum supremacy |
| 10:30am | Morning Break |
| 11:00am Gil Refael (Caltech) | Adventures in synthetic dimensions: new schemes for quantum control |
| 11:45am | Concluding discussion |
| 12:30pm | Lunch Break |
| 2:00pm | CONFERENCE END SHUTTLE TO BWSCI *Also available to SB Airport and SB Airbus, Goleta location (See Registration Desk BEFORE FRIDAY to sign up.) |