

KAVLI INSTITUTE FOR THEORETICAL PHYSICS
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KITP Conference: Open Quantum Systems in Quantum Simulators

(Apr 1 - Jun 7, 2019)

**Coordinators: Lincoln Carr, Susana Huelga, Sabrina Maniscalco, and
Vladan Vuletic**

**Scientific Advisors: Tilman Esslinger, Christian Roos, Irfan Siddiqi, and
Christine Silberhorn**

Monday, Apr 29, 2019

Session Chair: Vladan Vuletic (MIT)

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| 8: 40am Mark Bowick (KITP Deputy Director) | Welcome |
| 8: 50am Andreas Wallraff (ETH Zurich) | Entanglement Stabilization using Parity Detection and Real-Time Feedback in Superconducting Circuits |
| 9: 35am Eliot Kapit (Colo. Mines) | Entanglement and Complexity of Interacting Qubits Subject to Asymmetric Noise |
| 10: 20am | Morning Break |
| 10: 50am Lincoln Carr
Andrew Daley
Vladan Vuletic
Roberta Zambrini{breakout} | 4 Break-out discussions |
| 11: 10am Full group{discussion} | Reconvene for discussion |
| Session Chair: Valentina Parigi (UPMC) | |
| 11: 30am Iacopo Carusotto (Trento) | Quantum Optical Tools for Generation, Manipulation, and Diagnostic of Driven-Dissipative Many-Body States of Light |
| 12: 15pm Jonathan Simon (James Franck Inst.) | A Dissipatively Stabilized Mott Insulator of Photons |
| 1: 00pm | Lunch Break |
| 2: 00pm Lincoln Carr
Sabrina Maniscalco
Vladan Vuletic
Roberta Zambrini{breakout} | 4 Break-out discussions |
| 2: 20pm Full group{discussion} | Reconvene for discussion |

Session Chair: Ines de Vega (U Munich)

2:40pm Daniel Braun (U Tübingen)	Quantum Chaotic Sensors
3:25pm Antonella De Pasquale (SNS Pisa)	Open Quantum Systems: from the transmission of correlations to the measurement problem
4:10pm	Afternoon Break
4:40pm Lincoln Carr Sabrina Maniscalco Vladan Vuletic Roberta Zambrini{breakout}	4 Break-out discussions
5:00pm Full group{discussion}	Reconvene for discussion
5:30pm	SHUTTLE TO BWSCI

Tuesday, Apr 30, 2019**Session Chair: Kavan Modi (Monash U)**

8:50am Jukka Pekola (Aalto U)	Heat Transport Through Superconducting Quantum Circuits: Experiments and Local vs Global Picture of an Open Quantum System
9:35am Nicole Yunger Halpern (Harvard)	Simple Bounds on Far-from-Equilibrium Machines (Hat Tip to Quantum Information Theory)
10:20am	Morning Break
10:50am Lincoln Carr Sabrina Maniscalco Vladan Vuletic Roberta Zambrini{breakout}	4 Break-out discussions
11:10am Full group{discussion}	Reconvene for discussion

Session Chair: Hilary Hurst (JQI)

11:30am Mete Atature (Cambridge)	Quantum Interface of an Electron Qubit and a Nuclear Ensemble
12:15pm Christopher Monroe (Maryland)	Quantum Simulations with Countable Numbers of Atoms
1:00pm	Lunch Break
2:00pm Lincoln Carr Sabrina Maniscalco Vladan Vuletic Roberta Zambrini{breakout}	4 Break-out discussions
2:20pm Full group{discussion}	Reconvene for discussion
2:40pm	Poster Session

4:10pm	Afternoon Break
4:40pm	Poster Session Continues
5:00pm	Discussion Time
5:30pm	RECEPTION-KITP Courtyard
6:00pm	SPECIAL EVENTS DINNER-KITP Courtyard
8:00pm	SHUTTLE TO BWSCI

Wednesday, May 01, 2019

Session Chair: Hans-Peter Buechler (Stuttgart U.)

8:50am	Antoine Browaeys (IOGS)	Many-body Physics with Arrays of Rydberg Atoms
9:35am	Igor Lesanovsky (Nottingham U)	Exploring Quantum Non-equilibrium Processes with Absorbing States on Rydberg Quantum Simulators

10:20am **Morning Break**

10:50am	Lincoln Carr Sabrina Maniscalco Vladan Vuletic Roberta Zambrini{breakout}	4 Break-out discussions
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11:10am Full group{discussion} Reconvene for discussion

Session Chair: Sebastian Diehl (U of Cologne)

11:30am	Pedram Roushan (Google Inc.)	Dynamical and Spectroscopic Signatures of Many-body Localization
12:15pm	Sean Hartnoll (Stanford)	Locality Bound for Dissipative Quantum Transport

1:00pm Maggie Sherriffs (KITP) Announcement: Follow on Program

1:00pm **Lunch Break**

2:00pm	Mari Carmen Banuls Simone Montangero Vladan Vuletic Roberta Zambrini{breakout}	4 Break-out discussions
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2:20pm Full group{discussion} Reconvene for discussion

2:40pm FREE AFTERNOON-Shuttle Available to BWSCI

Thursday, May 02, 2019

Session Chair: Mari Carmen Banuls (MPQ)

- 8: 50am Benjamin Lev (Stanford) Many-body Cavity QED with Multimode Resonators
- 9: 35am Giuseppe Carleo (Flatiron Inst.) Neural-network States for Open Quantum Systems
- 10: 20am **Morning Break**
- 10: 50am Mari Carmen Banuls 4 Break-out discussions
Andrew Daley
Susana Huelga
Simone Montangero{breakout}
- 11: 10am Full group{discussion} Reconvene for discussion
Session Chair: Andrea Smirne (Ulm U)
- 11: 30am Jelena Vuckovic (Stanford) Connecting Quantum Systems through Optimized Photonics
- 12: 15pm Clifford Johnson (USC) Black holes and Quantum Heat Engines
- 1: 00pm **Lunch Break**
- 2: 00pm Mari Carmen Banuls 4 Break-out discussions
Andrew Daley
Susana Huelga
Simone Montangero{breakout}
- 2: 20pm Full group{discussion} Reconvene for discussion
- 2: 40pm Poster Session
- 4: 10pm **Afternoon Break**
- 4: 40pm Poster Session continues
- 5: 00pm Discussion Time
- 5: 30pm **RECEPTION-KITP Courtyard**
- 6: 00pm **SPECIAL EVENTS DINNER-KITP Courtyard**
- 8: 00pm **SHUTTLE TO BWSCI**

Friday, May 03, 2019

Session Chair: Michael Fleischhauer (TU Kaiserslautern)

- 8: 50am Tilman Esslinger (ETH Zurich) Twisted by Dissipation
- 9: 35am Christine Muschik (IQC Inst.) Quantum Error Correction by Dissipation
- 10: 20am **Morning Break**
- 10: 50am Mari Carmen Banuls 4 Break-out discussions
Andrew Daley
Susana Huelga

Simone Montangero{breakout}

11: 10am Full group{discussion}

Reconvene for discussion

Session Chair: Simone Montangero (UNIPD)

11: 30am Joerg Wrachtrup (U of Stuttgart)

Observation of Quantum Random Walks in Spin Systems

12: 15pm Martin Plenio (Ulm U)

Coherence and Noise: Theoretical Aspects of Quantum Dynamics in the Presence of Environments

1: 00pm

Lunch Break

2: 00pm Mari Carmen Banuls

4 Break-out discussions

Andrew Daley

Susana Huelga

Simone Montangero{breakout}

2: 20pm Full group{discussion}

Reconvene for discussion

2: 40pm John Bollinger (NIST)

Quantum Simulation and Sensing with Large Trapped Ion Crystals

3: 25pm Giovanna Morigi (Saarland U)

Disorder and Long-range Interactions in Many-body Cavity Quantum Electrodynamics

4: 10pm

Afternoon Break

4: 40pm Mari Carmen Banuls

4 Break-out discussions

Andrew Daley

Susana Huelga

Simone Montangero{breakout}

5: 00pm Full group{discussion}

Reconvene for discussion

5: 30pm

CONFERENCE END-SHUTTLE TO BWSCI *Also available to SB Airport and SB Airbus, Goleta location. (See Registration Desk BEFORE FRIDAY to sign up.)