

Princeton Center for Theoretical Science

The Princeton Center for Theoretical Science is dedicated to exploring the frontiers of theory in the natural sciences. Its purpose is to promote interaction among theorists and seed new directions in research, especially in areas cutting across traditional disciplinary boundaries.

The Center is home to a corps of Center Postdoctoral Fellows, chosen from nominations made by senior theoretical scientists around the world. A group of senior Faculty Fellows, chosen from science and engineering departments across the campus, are responsible for guiding the Center. Center activities include focused topical programs chosen from proposals by Princeton faculty across the natural sciences. The Center is located on the fourth floor of Jadwin Hall, in the heart of the campus “science neighborhood”. The Center hopes to become the focus for innovation and cross-fertilization in theoretical natural science at Princeton.

Faculty Fellows

Igor Klebanov, Director
Ned Wingreen, Associate Director
Jeremy Goodman
Duncan Haldane
Andrej Košmrlj
Mariangela Lisanti
Frans Pretorius
Silviu Pufu
Eliot Quataret
Shinsei Ryu

Center Postdoctoral Fellows

Vir Bulchandani 2020-2023	Minjae Cho 2021-2024
Giorgio Cipolloni 2021-2024	Scott Collier 2020-2023
Trevor GrandPre 2022-2024	David Hosking 2022-2025
Brooke Husic 2020-2023	Jonah Kudler-Flam 2022-2025
Yves Kwan 2022-2025	Alejandro Martinez-Calvo 2021-2024
Elias Most 2020-2023	Anirudh Prabhu 2022-2025
Carolyn Raithel 2020-2023	Rhine Samajdar 2022-2025
Frank Schindler 2020-2023	Nicole Shibley 2021-2024

To find out more about Center Postdoctoral Fellowships and Programs see: <https://pcts.princeton.edu>



Quantum Information, Dynamics and Ergodicity: From Many-Body Systems to Gravity

February 27 – March 2, 2023

Organizers

Vir B. Bulchandani, Amos Chan, Jonah Kudler-Flam, Biao Lian, Vladimir Narovlansky, Shinsei Ryu, and Gautam Satishchandran

Sponsored in part by the William Kuncik'75-Cheryl LaFleur'75 Endowment

Quantum Information, Dynamics and Ergodicity: From Many-Body Systems to Gravity

Monday, February 27, 2023

- 9:00 Light Breakfast
9:20-9:30 Welcome and Introductions
- 9:30-10:20 Quantum criticality and dynamics at finite entanglement
Joel Moore
- 10:20-11:10 Universality classes of Entanglement Transitions in Random Tensor Networks and Monitored Quantum Circuits
Andreas Ludwig
- 11:10-11:40 Coffee break
- 11:40-12:30 Measurement and Feedback Driven Entanglement Transition in the Probabilistic Control of Chaos
Thomas Iadecola
- 12:30-2:00 Lunch at PCTS
- 2:00-2:50 Complexity, randomness, and un-measurability: the origin of black hole entropy
Vijay Balasubramanian
- 2:50-3:40 Operator growth and black hole formation
Ying Zhao
- 3:40-4:10 Coffee break
- 4:10-5:00 Special weak integrability breaking perturbations of integrable models
Olexei Motrunich
- 5:00-7:30 Reception for everyone at PCTS

Tuesday, February 28, 2023

- 9:00 Light Breakfast
- 9:30-10:20 Quantum information phase transitions in radiative circuits and topological codes
Ehud Altman

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Tuesday, February 28, 2023 (cont.)

- 10:20-11:10 Topological Defects in Floquet Circuits
Aditi Mitra
- 11:10-11:40 Coffee break
- 11:40-12:30 Measuring rapidities, testing generalized hydrodynamics, and finding hydrodynamization
David Weiss
- 12:30-2:00 Lunch at PCTS
- 2:00-2:50 Statistics of Matrix Elements in Integrable Theories
Fabian Essler
- 2:50-3:40 Integrability breaking out of equilibrium: generalized quantum Boltzmann equations.
Benjamin Doyon
- 4:00-5:00 **Physics Colloquium--Jadwin Hall, Room A-10**
Holography with end-of-the-world branes and Quantum Entanglement
Tadashi Takayanagi

Wednesday, March 1, 2023

- 9:00 Light Breakfast
- 9:30-10:20 TBA
Edward Witten
- 10:20-11:10 Gravity as a Quantum Error Correcting code in the large-N limit
Thomas Faulkner
- 11:10-11:40 Coffee break
- 11:40-12:30 Anyonic Chains and von Neumann algebras
Stefan Hollands
- 12:30-2:00 Lunch at PCTS

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Wednesday, March 1, 2023 (cont.)

- 2:00-2:50 Emergent state designs from quantum chaotic dynamics: a deep form of quantum thermalization
Wen Wei Ho
- 2:50-3:40 The statistical properties of eigenstates in chaotic many-body quantum systems
John Chalker

Thursday, March 2, 2023

- 9:00** **Light Breakfast**
- 9:30-10:20 Holographic insights into open quantum systems
Mukund Rangamani
- 10:20-11:10 Stringy effects in SYK scrambling
Mark Mezei
- 11:10-11:40** **Coffee break**
- 11:40-12:30 Effective field theories for quantum chaotic systems
Hong Liu
- 12:30** **Conclusion and Lunch at PCTS**