

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
Andrei Bernevig
Jeremy Goodman
Duncan Haldane
Andrew Houck
Mariangela Lisanti
Thanos Panagiotopoulos
Frans Pretorius

Center Postdoctoral Fellows

Ricard Alert-Zenon 2018-2021
Nathan Benjamin 2018-2021
Andrew Chael 2019-2022
Amos Chan 2019-2022
Fani Dosopoulou 2018-2021
Biao Lian 2017-2020
Vladimir Narovlansky 2019-2022
Sabrina Pasterski 2019-2022
Abhinav Prem 2018-2021
Oren Slone 2018-2020
Yizhi You 2017-2020
Xinan Zhou 2018-2021

To find out more about Center Postdoctoral Fellowships and Programs see:

<http://pcts.princeton.edu>



Marching Towards Quantum Supremacy

November 13-15, 2019

**PCTS Seminar Room
Jadwin Hall, Fourth Floor, Room 407**

Program Organizers

Sergey Frolov
Michael Gullans
Jason Petta
Shivaji Sondhi
Hakan Tureci

Marching Towards Quantum Supremacy

Wednesday, November 13, 2019

- 8:30 – 8:55** Continental breakfast
- 8:55 – 9:00 Welcome/Introduction
- 9:00 – 9:45 Towards topological quantum computing with Kitaev materials
Jason Alicea
- 9:45 – 10:30 Elements for improved trapped-ion quantum computing
Andrew Wilson
- 10:30 – 10:50** Coffee break
- 10:50 – 11:35 Exploring integrated technologies to advance trapped-ion quantum computing
John Chiaverini
- 11:35 – 12:20 Toward quantum information processing with Rydberg atom arrays
Hannes Pichler
- 12:20 – 1:15** Lunch at PCTS
- 1:15 – 2:00 Towards high-fidelity gates in Ytterbium Rydberg atom arrays
Jeff Thompson
- 2:00 – 2:45 Quantum engineering systems of superconducting qubits
Will Oliver
- 2:45 – 3:15** Coffee break
- 3:15 – 4:00 Progress toward a superconducting logical qubit
Leo DiCarlo
- 4:00 – 4:45 Fault-tolerant quantum computation with cat-qubits
Mazyar Mirrahimi
- 4:45 – 5:30 Algorithms and system design considerations for nisq machine
Matthew Reagor
- 5:30-6:15 Benchmarking near-term quantum processors
Lev Bishop
- 6:15** Reception at PCTS

Thursday, November 14, 2019

- 8:00 – 8:30** Light Breakfast
- 8:30 – 9:15 Quantum supremacy in a programmable quantum computer
John Martinis
- 9:15 – 10:00 Theoretical reflections on quantum supremacy
Umesh Vazirani
- 10:00-10:45 High volume manufacturing of silicon spin qubits
Tom Watson
- 10:45 – 11:00** Coffee break
- 11:00 – 11:45 Si platform for fault tolerant spin-based quantum computing
Seigo Tarucha
- 11:45 – 12:30 Silicon-based quantum computing
Michelle Simmons
- 12:30 – 1:15** Lunch at PCTS
- 1:15 – 2:00 Marching towards robust spin qubits in silicon
Thaddeus Ladd
- 2:00 – 2:45 Circuit QED with mesoscopic circuits: from spin/photon coupling to engineered interactions between photons
Audrey Cottet
- 2:45 – 3:30 Quantum control of spin qubits in arrays of silicon quantum dots
Michael Gullans
- 3:30 – 4:00** Coffee break
- 4:00 – 5:00** Physics Colloquium—Room A-10 Jadwin Hall
Atomic qubits in silicon
Michelle Simmons

Marching Towards Quantum Supremacy

Friday, November 15, 2019

8:30 – 9:00 Continental breakfast

9:00 – 9:45 Practical quantum computers based on trapped ions
Jungsang Kim

9:45 – 10:30 Majorana and Andreev bound states in proximitized rashba wires and layers
Daniel Loss

10:30 – 10:50 Coffee break

10:50 – 11:35 Majorana modes in nanowires: good, bad, and ugly
Sankar Das Sarma

11:35 – 12:20 Majorana qubit
Leo Kouwenhoven

12:20 Concluding remarks and lunch at PCTS