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
Paul Steinhardt, Director
Igor Klebanov, Associate Director
Andrei Bernevig
Duncan Haldane
Andrew Houk
Eve Ostriker
Thanos Panagiotopoulos
Frans Pretorius
Ned Wingreen

Center Postdoctoral Fellows
Ricard Alert-Zenon 2018-2021
Nathan Benjamin 2018-2021
Fani Dosopoulou 2018-2021
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Oren Slone 2018-2020
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To find out more about Center Postdoctoral Fellowships and Programs see: http://pcts.princeton.edu/pcts

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“Strongly Correlated Systems & Interactions in Quantum Matter”
April 25-28, 2019

PCTS Seminar Room
Jadwin Hall, Fourth Floor, Room 407

Program Organizers
B. Andrei Bernevig
Bob Cava
Biao Lian
Ali Yazdani
Yizhi You

This workshop is co-sponsored by the Department of Physics and PCCM and the Gordon and Betty Moore Foundation.
“Strongly Correlated Systems & Interactions in Quantum Matter”

**Thursday, April 25, 2019**

12:00-1:15 Lunch at PCTS

1:15-1:20 Welcome and Introductions

1:20-2:00 Coupled interactions in strongly correlated superconductors  
Zhi-Xun Shen, Stanford University

2:00-2:40 The strange metal state of the electron-doped cuprates  
Richard Greene, University of Maryland

2:40-3:20 The Physics of Tc  
Steve Kivelson, Stanford University

3:20-4:00 Coffee Break

4:00-4:40 High-resolution neutron and x-ray scattering from cuprates  
Bernhard Keimer, Max Planck, Stuttgart

4:40-5:20 Thirty years of the Cuprates with Phuan  
Philip Anderson, Princeton University

5:30 WELCOME RECEPTION AT PCTS

**Friday, April 26, 2019**

8:30 Light Breakfast

9:00-9:40 Correlations and Superconductivity in Moiré Superlattices  
Pablo Jarillo-Herrero, MIT

9:40-10:20 Electron-electron interactions in Magic Angle Twisted Bilayer Graphene  
Allan MacDonald, University of Texas, Austin

10:20-10:40 Coffee break

10:40-11:20 Spin transport through a Skyrme solid in graphene  
Andrea Young, UCSB

11:20-12:00 Correlations and Topology in Moire Materials  
Ashvin Vishwanath, Harvard University

12:00-12:40 Strategies for transforming the band structure of 2D materials  
Eva Andrei, Rutgers University

12:40-2:00 Lunch at PCTS

2:00-2:40 From charge density wave to spin liquid and pair density wave  
Patrick Lee, MIT/Caltech

2:40-3:20 Half-integer thermal quantum Hall effect in a quantum spin liquid  
Yuji Matsuda, Kyoto University

3:20-4:00 Coffee Break

4:00-4:40 Uncovering hidden states and phases in quantum materials using ultrafast electron calorimetry  
Margaret Murnane, University Colorado, Boulder

4:40-5:20 Probing magnons in quantum Hall ferromagnets  
Amir Yacoby, Harvard University

**Saturday, April 27, 2019**

8:30 Light Breakfast

9:00-9:40 Dirac Electrons in Kagome Lattice Materials  
Joe Checkelsky, MIT

9:40-10:20 Magnetoexciton superfluid and ferromagnetic superconductivity in graphene  
Philip Kim, Harvard University

10:20-11:00 Coffee break

11:00-11:40 Exotic spin-orbital entangled phases on honeycomb lattice  
Hidenori Takagi, Max Planck, Stuttgart

11:40-12:20 Topological states of Cd3As2 Thin Films  
Susanne Stemmer, UCSB

12:20-1:30 Lunch at PCTS

1:30-2:10 Exploring skyrmions and emergent magnetic monopoles with large topological responses  
Yoshinori Tokura, RIKEN & University of Tokyo

2:10-2:50 Freestanding Crystalline Oxide Membranes and Heterostructures  
Harold Hwang, Stanford University
2:50-3:10  Coffee Break

3:10-3:50  New variations of Hall effect
           Liang Fu, MIT

3:50-4:30  Quantum oscillations in resistivity and magnetization of Kondo
           insulators
           Lu Li, University of Michigan, Ann Arbor

Sunday, April 28, 2019
8:30    Light Breakfast

9:00-9:40  Incredible crystalline perfection and novel physics in layered
           delafossite metals
           Andrew Mackenzie, Max Planck, Dresden

9:40-10:20 Freezing on a Sphere: Classical 2D Wigner Crystallization on
           a Water Droplet
           Paul Chaikin, NYU

10:40-11:20  Geometry of flux-attachment in the fractional quantum Hall
             effect
             Duncan Haldane, Princeton University

11:20-12:00  Electronic structure and electronic order in lightly doped
             cuprates studied by STM
             Yayu Wang, Tsinghua University

12:00-12:05  Concluding Remarks