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
Paul Steinhardt, Director
Igor Klebanov, Associate Director
Adam Burrows
Curtis Callan
Garnet Chan
Pablo Debenedetti
David Huse
Howard Stone

Center Postdoctoral Fellows
Ian Abel 2013-2016
Timothy Berkelbach 2014-2017
Daniel Harlow 2012-2015
Anna Iijas 2014-2017
Samuel Lee 2012-2015
Yi Li 2013-2016
David Limmer 2013-2016
Mark Mezei 2014-2017
Rahul Nandkishore 2012-2015
Titus Neupert 2013-2016
Shivaji Sondhi 2013-2016
Ali Yazdani 2014-2017

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

Majorana Zero Modes and Beyond

29-31 October 2014
Jadwin Hall, Room 407

Workshop Organizers:
Curt von Keyserlingk
Yi Li
Titus Neupert
N. Phuan Ong
Shivaji Sondhi
Ali Yazdani

This program is co-sponsored by the Office of Naval Research (ONR) and MRSEC-PCCM
Wednesday, 29 October 2014

8:50 am Welcome and Introductions
Ali Yazdani, Princeton University

Chair: Nadya Mason, University of Illinois

9:00 “Majorana fermions in nanowires: current status”
Sergey Frolov, University of Pittsburgh

9:45 “Quantum Dynamics of the Fluxonium Device”
Leonid Glazman, Yale University

10:30 Coffee Break

10:45 “Off-equilibrium superconducting quasiparticles and the fluxonium artificial atom”
Michel Devoret, Yale University

11:30 “Parity crossings and Majorana-like resonances in superconductor-semiconductor nanostructures”
Silvano De Franceschi, CEA Grenoble

12:15 Lunch at PCTS, Jadwin Hall, Fourth Floor
Chair: Ken Shih, UT Austin

2:00 “Observation of Majorana Fermions in Ferromagnetic Atomic Chains on a Superconductor”
Ali Yazdani, Princeton University

2:45 “A new platform for Majorana fermions”
Andrei Bernevig, Princeton University

3:30 Coffee Break

3:45 “Toward Optimized Topological Superconductivity in Transition Metal Atom Chains”
Allan MacDonald, UT Austin

4:30 Informal Discussions

5:30 pm Welcome Reception at PCTS

Majorana Zero Modes and Beyond

Thursday, 30 October 2014

Chair: Erik Bakkers, Eindhoven Technical University

9:00 “Dynamics of Majorana bound states.”
Felix von Oppen, Freie University, Berlin

9:45 “Majorana Zero Modes in Gapless Systems”
Chetan Nayak, Microsoft Station Q

10:30 Coffee Break

11:00 “Parafermion-supporting platform for topological quantum information processing”
Leonid Rokhinson, Purdue University

11:45 “Helical Edge States and Beyond in InAs/GaSb Bilayers”
Rui-Rui Du, Rice

12:30 Lunch at PCTS, Jadwin Hall, Fourth Floor
Chair: Phuan Ong, Princeton University

2:00 “Induced Superconductivity in the Quantum Spin Hall Edge”
Amir Yacoby, Harvard University

2:45 “Transport and Josephson phenomena in hybrid superconductor-topological insulator devices and topological superconductors”
Dale Van Harlingen, University of Illinois

3:30 Coffee Break

3:45 “The Time Reversal Invariant Fractional Josephson Effect”
Charles Kane, University of Pennsylvania

4:45 Poster session and Happy Hour at PCTS
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00</td>
<td>“Superconducting edge-mode transport in InAs/GaSb heterostructures”</td>
</tr>
<tr>
<td></td>
<td>Vlad Pribiag, University of Minnesota</td>
</tr>
<tr>
<td>9:45</td>
<td>“Non-abelian physics beyond Majorana fermions and towards one dimension”</td>
</tr>
<tr>
<td></td>
<td>Ady Stern, Weizmann</td>
</tr>
<tr>
<td>10:30</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>10:45</td>
<td>&quot;Majorana takes charge.&quot;</td>
</tr>
<tr>
<td></td>
<td>Liang Fu, MIT</td>
</tr>
<tr>
<td>11:30</td>
<td>Adjournment and Lunch at PCTS, Jadwin Hall, Fourth Floor</td>
</tr>
</tbody>
</table>