

Exploring quantum phenomena and quantum matter in ultrahigh magnetic fields

Alexandria, Sep 21-22, 2017

Thursday, Sep. 21st, 2017

8:45 -- 9:00

Welcome and Introduction

1. Graphene Physics (Chair: Collin Broholm)

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|---------------|--------------|---|
| 9:00 - 9:30 | Cory Dean | Correlated electronic states in high magnetic fields |
| 9:30 - 10:00 | Andrea Young | Fractional Chern insulators in van der Waals heterostructures |
| 10:00 - 10:30 | Philip Kim | van der Waal heterostructures at the extreme quantum limit |

10:30 - 10:50 *Break*

2. Quantum and Topological Materials 1 (Chair: Brad Ramshaw)

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|---------------|----------------|---|
| 10:50 - 11:20 | James Analytis | Intertwined and topological quantum states
in high magnetic fields |
| 11:20 - 11:50 | Danna Freedman | Studies of Inorganic Materials at Extreme Conditions |

12:00 - 1:30 *Lunch*

3. Superconductivity (Chair: Lu Li)

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|--------------|--------------------|---|
| 1:30 -- 2:00 | Subir Sachdev | Topology and criticality in the high temperature superconductors |
| 2:00 - 2:30 | Brad Ramshaw | Crossing the dome: evolution of the Fermi surface across
optimal doping in high-Tc superconductors |
| 2:30 - 3:00 | Suchitra Sebastian | Unmasking unconventional phenomena in strongly correlated
materials using high magnetic fields |

3:00 - 3:20 *Break*

4. Prospects in high magnetic fields (Chair: Harold Hwang)

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|-------------|----------------|--|
| 3:20 - 3:50 | Mark Bird | 60 T dc: harnessing the power of high temperature
superconductors |
| 3:50 - 4:20 | Chuck Mielke | 135T pulsed: harnessing state-of-the-art nanocomposites
and unique MagLab infrastructure. |
| 4:20 - 4:50 | Greg Boebinger | World Leadership and the Complementarity of
a 60T DC Magnet and a 135T Pulsed Magnet |

4:50 - 5:40 **5 Panel Discussion 1 (Chair: N. Phuan Ong)**

Bird, Boebinger, Gupta, Michael, Mielke

Friday, Sept. 22nd, 2017

6. Quantum and Topological Materials 2 (Chair: Andrea Young)

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|--------------|-------------------|---|
| 9:00 -- 9:30 | Ashvin Vishwanath | Emergent Dirac Fermions |
| 9:30 - 10:00 | Liang Fu | Giant thermoelectric effect in Dirac materials under
a quantizing magnetic field |

10:00 - 10:30 Andre Bernevig Topological Quantum Chemistry

10:30 - 10:50 *Break*

7. Synthetic structures (Chair: Minhya Lee)

10:50 - 11:20 Harold Hwang Complex oxide heterostructures

11:20 - 11:50 Sean Seongshik Oh Topological quantum effects in thin film topological insulators at the magnetic quantum limit

12:00 -- 1:30 *Lunch*

8. Quantum and Topological Materials 3 (Chair: Meigan Aronson)

1:30 - 2:00 Janice Musfeldt Multiferroics in high magnetic fields

2:00 - 2:30 Nandini Trivedi Magnetism and Superconductivity in Chern Insulators

2:30 - 3:00 Vivien Zapf Overview of Quantum Materials Research at the NHMFL

3:00 - 3:20 *Break*

9. Quantum and Topological Materials 4 (Chair: Sean Oh)

3:20 - 3:50 Collin Broholm New opportunities to form and probe quantum matter through ultrahigh field neutron scattering

3:50 - 4:20 Minhya Lee Anomalous thermal conductivity in the honeycomb magnet RuCl_3

4:20 - 4:50 Lu Li Correlated Topological Materials in High Magnetic Fields

10. Panel discussion 2 (Chair: N. Phuan Ong)

4:50 - 5:40 Young, Sebastian, Li, Zapf, Kim