International School
17 - 28 February 2020

Gapless Fermions - from Fermi liquids to strange metals

PROGRAM

Scientific coordinators:
Subhro Bhattacharjee • International Centre for Theoretical Sciences, Bengaluru, India
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Organisation:
Maria Voigt • MPIPKS, Dresden, Germany
The program will be continuously updated during the event. This version was printed on February 21, 2020.
Program

Sunday, 16 February
18:00 - 20:00  Registration at guest house 4, library
19:00 - 21:00  Welcome reception and dinner at the MPIPKS
20:00 - 21:30  Informal discussions
Monday, 17 February

08:45 - 09:00  Scientific coordinators
              Opening

09:00 - 11:00  Igor Herbut (Simon Fraser University)
              Relativistic fermions in condensed matter:
              symmetries, interactions, phase transitions I

11:00 - 11:30  Coffee break

11:30 - 12:30  Igor Herbut (Simon Fraser University)
              Relativistic fermions in condensed matter:
              symmetries, interactions, phase transitions II

12:30 - 13:30  Lunch break

13:30 - 14:00  Informal discussions

14:00 - 16:00  Jeff Rau (University of Windsor)
              From Microscopics to Effective Models I

16:00 - 16:30  Coffee break

16:30 - 17:30  gaples20-Colloquium chair: Paul McClarty (MPIPKS)

16:30 - 17:30  gaples20-Colloquium: Joseph Checkelsky
              (Massachusetts Institute of Technology)
              Synthesizing Model Quantum Materials

17:30 - 18:00  Informal discussions

18:00 - 19:00  Dinner

19:00 - 21:00  Informal discussions
Tuesday, 18 February

09:00 - 11:00  **Jeff Rau** (University of Windsor)
From Microscopics to Effective Models II

11:00 - 11:30  Coffee break

11:30 - 12:30  **Igor Herbut** (Simon Fraser University)
Relativistic fermions in condensed matter:
symmetries, interactions, phase transitions III

12:30 - 13:30  Lunch break

13:30 - 14:00  Informal discussions

14:00 - 16:00  **Amalia Coldea** (University of Oxford)
Using high magnetic fields to explore anomalous
electronic behaviour

16:00 - 16:30  Coffee break

16:30 - 17:30  **Joseph Checkelsky**
(Massachusetts Institute of Technology)
Experiments on strongly correlated metals

17:30 - 18:00  Informal discussions

18:00 - 19:00  Dinner

19:00 - 21:00  Poster session (focus on odd poster numbers)
**Program**

**Wednesday, 19 February**

09:00 - 11:00  **Ramamurti Shankar** (Yale University)
Renormalization Group for Fermions I

11:00 - 11:30  Coffee break

11:30 - 12:30  **Claudia Felser**
(Max Planck Institute for Chemical Physics of Solids)
Topological materials science

12:30 - 12:45  Group photo (to be published online)

12:45 - 14:00  Lunch break & informal discussions

14:00 - 15:00  **Johannes Gooth**
(Max Planck Institute for Chemical Physics of Solids)
The electron quasi-particle zoo in topological semimetals

15:00 - 16:00  **Veronika Sunko**
(Max Planck Institute for Chemical Physics of Solids)
Delafossite oxides: natural, ultra-pure metal-insulator heterostructures I

16:00 - 16:30  Coffee break

16:30 - 17:30  **Veronika Sunko**
(Max Planck Institute for Chemical Physics of Solids)
Delafossite oxides: natural, ultra-pure metal-insulator heterostructures II

17:30 - 18:00  Informal discussions

18:00 - 19:00  Dinner

19:00 - 21:00  Informal discussions
Thursday, 20 February

09:00 - 11:00  Ramamurti Shankar (Yale University)
Renormalization Group for Fermions II

11:00 - 11:30  Coffee break

11:30 - 12:30  Ramamurti Shankar (Yale University)
Renormalization Group for Fermions III

12:30 - 13:30  Lunch break

13:30 - 14:00  Informal discussions

14:00 - 16:00  Sung-Sik Lee (Perimeter Institute for Theoretical Physics & McMaster University)
Low energy field theories for non-Fermi liquids I

16:00 - 16:30  Coffee break

16:30 - 17:30  Sung-Sik Lee (Perimeter Institute for Theoretical Physics & McMaster University)
Low energy field theories for non-Fermi liquids II

17:30 - 18:00  Informal discussions

18:00 - 19:00  Dinner

19:00 - 21:00  Informal discussions
**Friday, 21 February**

09:00 - 11:00 **Ramamurti Shankar** (Yale University)  
Renormalization Group for Fermions IV

11:00 - 11:30 Coffee break

11:30 - 12:30 **Sung-Sik Lee** (Perimeter Institute for Theoretical Physics & McMaster University)  
Low energy field theories for non-Fermi liquids III

12:30 - 13:30 Lunch break

13:30 - 14:00 Informal discussions

14:00 - 16:00 **Sung-Sik Lee** (Perimeter Institute for Theoretical Physics & McMaster University)  
Low energy field theories for non-Fermi liquids IV

16:00 - 16:30 Coffee break

16:30 - 18:00 Discussions

18:00 - 19:00 Dinner

19:00 - 21:00 Informal discussions
Saturday, 22 February
09:00 - 15:00 excursion to Meissen (details will be given upon registration)

Monday, 24 February
09:00 - 11:00 Matthias Vojta (Technical University of Dresden)
Kondo physics, quantum phase transitions, and exotic metals I
11:00 - 11:30 Coffee break
11:30 - 12:30 Discussions
12:30 - 13:30 Lunch break
13:30 - 14:00 Informal discussions
14:00 - 16:00 Fakher Assaad (Julius-Maximilians-University Würzburg)
Fermion Quantum Monte Carlo I
16:00 - 16:30 Coffee break
16:30 - 17:30 Fakher Assaad (Julius-Maximilians-University Würzburg)
Fermion Quantum Monte Carlo II
17:30 - 18:00 Informal discussions
18:00 - 19:00 Dinner
19:00 - 21:00 Informal discussions
Tuesday, 25 February

09:00 - 11:00  Matthias Vojta (Technical University of Dresden)  
Kondo physics, quantum phase transitions,  
and exotic metals II

11:00 - 11:30  Coffee break

11:30 - 12:30  Matthias Vojta (Technical University of Dresden)  
Kondo physics, quantum phase transitions,  
and exotic metals III

12:30 - 13:30  Lunch break

13:30 - 14:00  Informal discussions

14:00 - 16:00  Walter Metzner  
(Max Planck Institute for Solid State Research)  
Functional renormalization group approach to  
correlated fermion systems I

16:00 - 16:30  Coffee break

16:30 - 17:30  Walter Metzner  
(Max Planck Institute for Solid State Research)  
Functional renormalization group approach to  
correlated fermion systems II

17:30 - 18:00  Informal discussions

18:00 - 19:00  Dinner

19:00 - 21:00  Poster session (focus on even poster numbers)
Wednesday, 26 February

09:00 - 11:00  Walter Metzner  
(Max Planck Institute for Solid State Research)  
Functional renormalization group approach to correlated fermion systems III

11:00 - 11:30  Coffee break

11:30 - 12:30  Thierry Giamarchi  
(Université de Genève)  
1D quantum systems and bosonization I

12:30 - 13:30  Lunch break

13:30 - 14:00  Informal discussions

14:00 - 16:00  Thierry Giamarchi  
(Université de Genève)  
1D quantum systems and bosonization II

16:00 - 16:30  Coffee break

16:30 - 17:30  Jörg Schmalian  
(Karlsruhe Institute of Technology)  
Transport Properties I

17:30 - 18:00  Informal discussions

18:00 - 19:00  Dinner

19:00 - 21:00  Informal discussions
**Thursday, 27 February**

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<th>Time</th>
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| 09:00 - 11:00 | **Jörg Schmalian**  
(Karlsruhe Institute of Technology)  
Transport Properties II |
| 11:00 - 11:30 | Coffee break                                                        |
| 11:30 - 12:30 | **Antoine Georges**  
(Collège de France, Paris and Flatiron Institute, New York City)  
Strong Correlations: the Dynamical Mean-Field Theory viewpoint I |
| 12:30 - 13:30 | Lunch break                                                          |
| 13:30 - 14:00 | Informal discussions                                                  |
| 14:00 - 16:00 | **Antoine Georges**  
(Collège de France, Paris and Flatiron Institute, New York City)  
Strong Correlations: the Dynamical Mean-Field Theory viewpoint II |
| 16:00 - 16:30 | Coffee break                                                         |
| 16:30 - 17:30 | **Andrew Mackenzie**  
(Max Planck Institute for Chemical Physics of Solids)  
Uniaxial pressure as a tuning parameter for condensed matter physics |
| 17:30 - 18:00 | Informal discussions                                                  |
| 18:00 - 19:00 | Dinner                                                               |
| 19:00 - 21:00 | Informal discussions                                                  |
**Friday, 28 February**

09:00 - 11:00  **Jörg Schmalian**  
(Karlsruhe Institute of Technology)  
Transport Properties III

11:00 - 11:30  Coffee break

11:30 - 12:30  **Jörg Schmalian**  
(Karlsruhe Institute of Technology)  
Transport Properties IV

12:30 - 13:30  Lunch break

13:30 - 13:45  Closing remarks

13:45 - 15:00  Informal discussions & departure