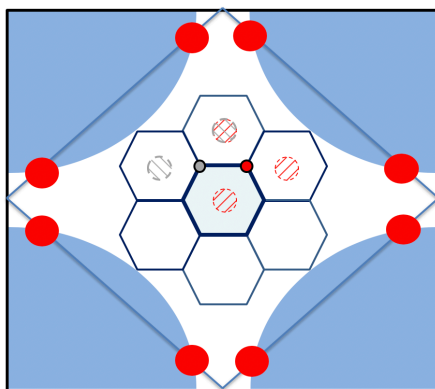


International Workshop & Seminar
5 - 16 August 2019 (workshop week: 5 - 9 August 2019)

Quantum Criticality and Topology in Correlated Electron Systems

PROGRAM



Supported by National High Magnetic Field Laboratory

Scientific coordinators:

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The program will be continuously updated during the event. This version was printed on August 12, 2019

Program

Sunday, 04 August

- | | |
|---------------|--|
| 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 |

workshop week - seminar rooms 1 - 3

Monday, 05 August

- 08:45 - 09:00 **Roderich Moessner (MPIPKS) & scientific coordinators**
Opening

Chair: Jonathan Ruhman
- 09:00 - 09:45 **Sergey Borisenko** (Leibniz Institute for Solid State and Materials Research (IFW) Dresden)
Nematicity and topology in iron-based superconductors from ARPES
- 09:45 - 10:30 **Takasada Shibauchi** (University of Tokyo)
Electronic nematicity in the pseudogap state in cuprates
- 10:30 - 11:00 Coffee break
- 11:00 - 11:45 **Rafael Fernandes**
(University of Minnesota, Minneapolis)
Vestigial electronic orders in correlated systems: nematicity and beyond
- 11:45 - 12:30 **Alain Sacuto** (University Paris Diderot)
Energy Scale of Charge Density Wave in Cuprates
- 12:30 - 13:30 Lunch break
- 13:30 - 14:00 Discussions

Chair: Erez Berg
- 14:00 - 14:45 **Mathias Scheurer** (Harvard University)
Gauge theories for the cuprate superconductors

- 14:45 - 15:30 **Yuxuan Wang** (University of Florida, Gainesville)
A solvable random model for the non-Fermi liquid pairing problem
- 15:30 - 16:00 **Richard Greene (via Skype)**
(University of Maryland, College Park)
Strange metal transport properties of an electron-doped cuprate
- 16:00 - 16:30 Coffee break
- qctces19-colloquium**
- Chair: Falko Pientka (MPIPKS)*
- 16:30 - 17:30 **Jörg Schmalian**
(Karlsruhe Institute of Technology)
Critical and incoherent electron systems and superconductivity within the Sachdev-Ye-Kitaev approach
- Chair discussion session: Erez Berg*
- 17:30 - 19:00 Discussions
- 19:00 - 20:00 Dinner
- 20:00 - 21:00 Informal discussions

Tuesday, 06 August

Chair: Kamran Behnia

09:00 - 09:45

Amit Kanigel
(Technion - Israel Institute of Technology)
Chiral superconductivity in 4Hb-TaS₂

09:45 - 10:30

Andrew Mackenzie (Max Planck Institute for
Chemical Physics of Solids Dresden)
Superconductivity and normal state properties of
Sr 2 RuO₄

10:30 - 11:00

Coffee break

11:00 - 11:45

Ronny Thomale
(Julius-Maximilians-University Würzburg)
Towards a microscopic theory of unconventional
superconductivity in Sr 2 RuO₄

11:45 - 12:30

Jonathan Ruhman (Bar-Ilan University)
Superconductivity in ultra low density semimetals
due to a ferroelectric quantum critical point

12:30 - 13:30

Lunch break

13:30 - 14:00

Discussions

Chair: Andrey V. Chubukov

14:00 - 14:45

Avi Klein (University of Minnesota, Minneapolis)
Intertwined pairing states of superconductivity at
a nematic quantum critical point

- 14:45 - 15:10 **Maxim Dzero** (Kent State University)
Thermodynamic properties of disordered
unconventional superconductors with competing
interactions
- 15:10 - 15:30 **Elio Koenig** (Rutgers University)
Crystalline symmetry protected helical Majorana
modes in the iron pnictides
- 15:30 - 16:00 Coffee break
- Chair: Hitesh Chamlani*
- 16:00 - 16:45 **Yuji Matsuda** (Kyoto University)
Half-integer thermal quantum Hall effect in a
chiral spin liquid
- 16:45 - 17:30 **Natalia Perkins**
(University of Minnesota, Minneapolis)
Probing Kitaev spin liquids
- 17:30 - 18:00 Discussions
- 18:00 - 19:00 Dinner
- 19:00 - 20:30 Poster session I (focus on odd poster numbers)
- 20:30 - 21:30 Informal discussions

Wednesday, 07 August

Chair: Dmitrii L. Maslov

- 09:00 - 09:45 **Sean Hartnoll** (Stanford University)
Simple models of strange transport
- 09:45 - 10:30 **Erez Berg** (The Weizmann Institute of Science)
Transport in strange metals
- 10:30 - 10:40 Group photo (to be published on the event's web page)
- 10:40 - 11:00 Coffee break
- 11:00 - 11:45 **Kamran Behnia** (CNRS Paris)
Metallicity and superconductivity in strontium titanate
- 11:45 - 12:30 **Jörg Schmalian**
(Karlsruhe Institute of Technology)
Lévy flights and hydrodynamic superdiffusion in quantum-critical transport
- 12:30 - 13:30 Lunch break
- 13:30 - 14:00 Discussions
- 14:00 Departure for the guided tours by tram from the institute (meeting point: reception of MPIPKS)
- 14:30 - 18:00 Meeting with the guides in Dresden Neustadt and guided tours (3 groups):
- group 1:** guided tour through Dresden incl. visit of the Royal Castle Dresden

group 2: guided tour through Dresden incl. visit of the Zwinger and its Mathematisch-Physikalischer Salon

group 3: guided tour through Dresden incl. tour of the ascent of the dome of Frauenkirche

18:00 - 21:00

Buffet-dinner at the restaurant **Palastecke**,
Schloßstraße 2 (Tel.: +49 351 48417330)

Thursday, 08 August

Chair: Oskar Vafek

- 09:00 - 09:45 **Eva Andrei** (Rutgers University)
Strategies for transforming the band structure of
2D materials
- 09:45 - 10:30 **Bogdan Andrei Bernevig** (Princeton University)
Possible Effects of Topology on Moire Lattices
- 10:30 - 11:00 Coffee break
- 11:00 - 11:45 **Elena Bascones** (Consejo Superior de
Investigaciones Cientificas)
Exploring correlations in twisted bilayer graphene
- 11:45 - 12:15 **Eli Fox** (Stanford University)
Emergent ferromagnetism in twisted bilayer graphene
- 12:15 - 12:45 **Matthias Punk**
(Ludwig-Maximilian University of Munich)
Metallic states with topological order in twisted
bilayer graphene
- 12:45 - 13:45 Lunch break
- 13:45 - 14:00 Discussions
- Chair: Yuxuan Wang*
- 14:00 - 14:45 **Senthil Todadri**
(Massachusetts Institute of Technology)
Correlations and topology in moire graphene
materials

- 14:45 - 15:30 **Jian Kang** (Florida State University & National High Magnetic Field Laboratory)
Nonlocal interactions beyond Hubbard model in twisted bilayer graphene near magic angle
- 15:30 - 16:00 Coffee break
- Chair: Yong-Baek Kim*
- 16:00 - 16:30 **Saurabh Maiti** (Concordia University)
Is the composite fermion state in graphene a Haldane's Chern insulator?
- 16:30 - 17:15 **Hitesh Changlani**
(Florida State University, Tallahassee)
The mother of all states of the kagome quantum antiferromagnet
- 17:15 - 18:00 Discussions
- 18:00 - 19:00 Dinner
- 19:00 - 20:30 Poster session II (focus on even poster numbers)

Friday, 09 August

Chair: Natalia Perkins

09:00 - 09:45 **Hidenori Takagi** (Max Planck Institute for Solid State Research Stuttgart)
Exotic spin-orbital entangled phases in 5d and 4d transition metal oxides

09:45 - 10:30 **Yong-Baek Kim** (University of Toronto)
Magnetic field induced novel phases in Kitaev magnets

10:30 - 11:00 Coffee break

Chair: Saurabh Maiti

11:00 - 11:45 **Roderich Moessner** (Max Planck Institute for the Physics of Complex Systems)
Intermediate energy spin dynamics

11:45 - 12:30 **Dam Son** (University of Chicago)
Hydrodynamics of composite fermions

12:30 - 13:30 Lunch break

13:30 - 14:00 Discussions

Chair: Revaz Ramazashvili

14:00 - 14:45 **Nicola Poccia** (Leibniz Institute for Solid State and Materials Research (IFW) Dresden)
Current progress in high temperature superconducting nano-devices using novel "van der Waals technologies"

- 14:45 - 15:15 **Alex Levchenko**
(University of Wisconsin, Madison)
Mesoscopic and anomalous Nernst effect in
disordered superconductors
- 15:15 - 15:45 **Julia Link** (Simon Fraser University)
Hydrodynamic transport in Luttinger semimetals
- 15:45 - 16:15 Coffee break
- 16:15 - 16:45 **Serguei Brazovskii** (LPTMS-CNRS, Paris-Sud
University)
From Chiral Anomaly to two-fluid hydrodynamics
for electronic Vortices
- 16:45 - 17:00 Closing remarks workshop week
- 17:00 - 18:00 Discussions
- 18:00 - 19:00 Dinner
- 19:00 - 21:00 Informal discussions

Monday, 12 August

Seminar room 1

Quantum Matter with and without Quasiparticles

09:45 - 10:00

Scientific coordinators
Opening seminar week

10:00 - 10:30

Coffee break

10:30 - 12:00

Black board talks and discussions
10:30 - 11:00 Revaz Ramazashvili
11:00 - 11:30 Elliot Christou
11:30 - 12:00 Avi Klein

12:00 - 13:00

Lunch break

13:00 - 15:00

Black board talks and discussions
13:00 - 13:30 Alex Levchenko
13:30 - 14:00 Andrey V. Chubukov
14:00 - 14:30 Dmitrii L. Maslov

15:00 - 15:30

Coffee break

Seminar room 3 and 4

15:30 - 18:00

Discussions

18:00 - 19:00

Welcome dinner of seminar week

19:00 - 21:00

Informal discussions

Tuesday, 13 August*Seminar room 4*

- 09:00 - 10:00 Informal discussions
- 10:00 - 10:30 Coffee break
- 10:30 - 11:30 **James Analytis**
(University of California, Berkeley)
Vanishing Quasiparticles Across a Quantum
critical point connecting two Fermi liquids
- 11:30 - 12:00 Discussions
- 12:00 - 13:00 Lunch break
- 13:00 - 14:00 Discussions
- 14:00 - 15:00 **Leo Radzihovsky**
(University of Colorado, Boulder)
Fractionalized mobility in a vector gauge theory
- 15:00 - 15:30 Coffee break
- 15:30 - 16:30 **Ilya Eremin** (Ruhr University Bochum)
Knight Shift and Leading Superconducting
Instability from Spin Fluctuations in Sr₂RuO₄
- 16:30 - 18:00 Discussions
- 18:00 - 19:00 Dinner
- 19:00 - 21:00 Informal discussions

Wednesday, 14 August

Seminar room 4

09:00 - 10:00	Informal discussions
10:00 - 10:30	Coffee break
10:30 - 11:30	Liang Fu (Massachusetts Institute of Technology) Supermetal
11:30 - 12:00	Discussions
12:00 - 13:00	Lunch break
13:00 - 14:00	Discussions
14:00 - 15:00	Aharon Kapitulnik (Stanford University) Thermal Transport, Thermalization, and Possible Signatures of Quantum Chaos in Complex Crystalline Materials
15:00 - 15:30	Coffee break
15:30 - 17:00	Discussions
17:00 - 19:00	Summer party / barbeque at MPIPKS
19:00 - 21:00	Informal discussions

Thursday, 15 August

Seminar room 4

09:00 - 10:00	Informal discussions
10:00 - 10:30	Coffee break
10:30 - 11:30	Subir Sachdev (Harvard University) Theory of a Planckian metal
11:30 - 12:00	Discussions
12:00 - 13:00	Lunch break
13:00 - 14:00	Discussions
14:00 - 15:00	Claudia Felser (Max Planck Institute for Chemical Physics of Solids Dresden) Magnetic Weyl Semimetals
15:00 - 15:30	Coffee break
15:30 - 18:00	Discussions
18:00 - 19:00	Dinner
19:00 - 21:00	Informal discussions

Friday, 16 August

Seminar room 1

Interaction meets topology

09:00 - 10:00	Black board talks and discussions 09:00 - 09:30 Kun Yang 09:30 - 10:00 Pavel Volkov
10:00 - 10:30	Coffee break
10:30 - 12:00	Black board talk and discussions 10:30 - 11:00 Inti Sodemann (MPIPKS) 11:00 - 11:30 Elio Koenig
12:00 - 13:00	Lunch break
13:00 - 14:00	Black board talks and discussions
14:00 - 14:15	Closing remarks seminar week and departure