KITP Conference: Electron Correlations beyond the Quasiparticle Paradigm: Theory and Experiment
(Sep 18-21, 2023)

Coordinators: Peter Armitage, Lara Benfatto, Andrey Chubukov, Sean Hartnoll, and Dmitrii Maslov

Monday, Sep 18, 2023

Strange metallicity in correlated electron systems, Chair: Andrey Chubukov (Minnesota)

8:50am Mark Bowick (KITP)
Welcome [Video][CC]
Universal theory of strange metals from spatially random interactions [Slides][Video][CC]

9:00am Subir Sachdev (Harvard)
Crucial role of vertex corrections for the magnetic pseudogap [Video][CC]

9:30am Mengxing Ye (U Rome)
Strange metal behavior by overdamped short-range fluctuations in cuprates and elsewhere [Video][CC]

Morning Break

11:00am Stephen Wilson (UCSB)
Charge correlations in the AV3Sb5 class of kagome superconductor [Video]

11:30am Kamran Behnia (ESPCI Paris)
How heat propagates in liquid 3He [Slides][Video]

Lunch Break

Non-Fermi liquid behavior, Chair: N. Peter Armitage (Johns Hopkins)

2:00pm Sri Raghu (Stanford)
Magnetoe-oscillations of a disorder-free three dimensional marginal Fermi liquid [Video][CC]

2:30pm Philip Phillips (U Illinois)
Beyond BCS: An Exact Model for Superconductivity and Mottiness [Video][CC]

3:00pm Philip Moll (MPI-SDM)
Chiral transport in metallic Kagome nets [Video][CC]

Afternoon Break

4:00pm Doug Natelson (Rice)
Shot noise in a strange meta [Slides][Video][CC]

4:30pm Laura Fanfarillo (ISC-CNR)
Nematicity and superconductivity in strongly correlated multiorbital systems [Slides][Video][CC]

5:00pm All Participants
Discussion

Tuesday, Sep 19, 2023

Talks are 20 min + 10 min discussion, Chair: Jan von Delft (LMU Munich)

9:00am Andrea Young (UCSB)
Spin-orbit coupling and orbital magnetism in crystalline graphene [Video][CC]

9:30am Laura Classen (TU-Munich/MPI Stuttgart)
Competing orders in twisted bilayer graphene [Video][CC]

10:00am Leonid Levitov (MIT)
Collinear carrier dynamics in Fermi gases and strongly-interacting 2D systems: non-Newtonian hydrodynamics and exotic superconductivity [Video][CC]

10:30am

Morning Break

11:00am Stevan Nadj-Perge (Caltech)
Superconductivity and Strong Correlations in (un)-Twisted Graphene Multilayers [Video][CC]

11:30am Elena Bascones (CSIC)
Heavy quasiparticles and cascades without symmetry breaking in twisted bilayer graphene [Slides][Video][CC]

12:00pm All Participants
Discussion

Lunch Break

Collective excitations in correlated electron systems and topological properties, Chair: Dmitrii Maslov (Florida)

2:00pm Dirk Van der Marel (Geneva)
Low energy electrodynamicos of superconducting cuprates and titanates [Slides][Video][CC]

2:30pm Erik van Heumen (U Amsterdam)
On black holes and momentum relaxation in the cuprates [Video][CC]

3:00pm Lara Benfatto (U Rome)
Collective modes in superconductors and their spectroscopic detection: experimental advances and theoretical challenges [Slides][Video][CC]

3:30pm

Afternoon Break

4:00pm Debanjan Chowdhury (Cornell)
Strong-coupling approaches to moiré superconductivity [Video][CC]

degennes narrowing and Structured liquid behavior in a strange meta [Video][CC]

5:00pm All Participants
Discussion

SPECIAL EVENTS DINNER

Wednesday, Sep 20, 2023

Probes of strange metallic behavior, Chair: Gertrud Zwicknagl (TU Braunschweig)

9:00am Aharon Kapitulnik (Stanford)
Anomalous thermal transport in strange metals: Beyond the MIR limit and near CDW transitions [Video][CC]

9:30am Dominic Else (Perimeter Inst.)
Infinite-dimensional emergent symmetry group in non-Fermi liquids: hydrodynamics and holography [Slides][Video][CC]

10:00am Girsh Blumberg (Rutgers)
Raman spectroscopy of strange metal [Video][CC]

10:30am

Morning Break

11:00am Martin Greven (Minnesota)
Planckian dissipation in the cuprates [Slides][Video][CC]

11:30am N. Peter Armitage (Johns Hopkins)
Energy relaxation and dynamics in correlated metal [Video][CC]

12:00pm All Participants
Discussion
12:30pm Lunch Break

1:30pm Philip Phillips (U Illiniois)  
Dirk Van Der Marel (Geneva)

Performance [Video]

Strong correlations and superconductivity, Chair: Massimo Capone (SISSA)

1:30pm Joerg Schmalian (KIT, Karlsruhe)  
Mohit Randeria (Ohio State)

Surprises and insights from electron doped cuprates [Video] [CC]

2:00pm Z-X Shen (Stanford)

Crossover from BCS to strange-metal superconductivity [Video] [CC]

Afternoon Break

2:30pm Philip Phillips (U Illinois)
Dirk Van Der Marel (Geneva)

Crossover from BCS to strange-metal superconductivity [Video] [CC]

2:30pm Dirk Van Der Marel (Geneva)

Superconductivity in strongly correlated systems and flat-bands: bounds on T_c [Video] [CC]

3:00pm Z-X Shen (Stanford)

Departs from Fermi-liquid physics in Hund metals [Video] [CC]

3:00pm Joerg Schmalian (KIT, Karlsruhe)

Mechanism and Properties of Charge-4e Superconductivity [Slides] [Video] [CC]

3:30pm Joerg Schmalian (KIT, Karlsruhe)

Discussion

4:00pm Luca De' Medici (ESPCI Paris)

Departures from Fermi-liquid physics in Hund metals [Video] [CC]

4:00pm Xiaoyu Wang (Florida)

Mechanism and Properties of Charge-4e Superconductivity [Slides] [Video] [CC]

5:00pm All Participants

RECEPTION

5:00pm All Participants

SPECIAL EVENTS DINNER

6:00pm SHUTTLE TO BWSCI

Thursday, Sep 21, 2023

9:00am Erez Berg (Weizmann Inst.)

A Criterion for Strange Metallic behavior in the Lorenz Ratio [Video] [CC]

9:30am Andy Lucas (U Colorado-Boulder)

Spatially resolved transport of interacting electrons [Slides] [Video] [CC]

10:00am Thomas Devereaux (Stanford)

Transport in the Hubbard model - quantum Monte Carlo study [Video] [CC]

Morning Break

2:00pm Conference End-Shuttle to BWSCI *Also available to SB Airport and SB Airbus, Goleta location (See Registration Desk BEFORE THURSDAY to sign up.)