

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]
9:00am Subir Sachdev (Harvard)	Universal theory of strange metals from spatially random interactions[Slides][Video][CC]
9:30am Mengxing Ye (U. Utah/KITP)	Crucial role of vertex corrections for the magnetic pseudogap[Video][CC]
10:00am Marco Grilli (U Rome)	Strange metal behavior by overdamped short-range fluctuations in cuprates and elsewhere[Video][CC]
10:30am	Morning Break
11:00am Stephen Wilson (UCSB)	Charge correlations in the AV3Sb5 class of kagome superconductors[Video]
11:30am Kamran Behnia (ESPCI Paris)	How heat propagates in liquid ^3He [Slides][Video]
12:00pm All Participants	Discussion
12:30pm	Lunch Break

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

2:00pm Sri Raghu (Stanford)	Magneto-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 Mottness[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 metal[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
5:30pm	SHUTTLE TO BWSCI

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
12:30pm	Lunch Break

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

2:00pm Dirk Van der Marel (Geneva)	Low energy electrodynamics 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]
4:30pm Peter Abbamonte (U Illinois)	de Gennes narrowing and Structured liquid behavior in a strange metal[Video][CC]
5:00pm All Participants	Discussion
5:30pm	RECEPTION
6:00pm	SPECIAL EVENTS DINNER
8:00pm	SHUTTLE TO BWSCI

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]
9:30 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 metals[Video][CC]
10:30am	Morning Break
11:00am Martin Grevin (Minnesota)	Planckian dissipation in the cuprates?[Slides][Video][CC]
11:30am N. Peter Armitage (Johns Hopkins)	Energy relaxation and dynamics in correlated metals[Video][CC]
12:00pm All Participants	Discussion

12:30pm

Lunch Break

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

Performance[Video]

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

2:00pm Z-X Shen (Stanford)
2:30pm Joerg Schmalian (KIT, Karlsruhe)
3:00pm Mohit Randeria (Ohio State)
3:30pm

Surprises and insights from electron doped cuprates[Video][CC]
Crossover from BCS to strange-metal superconductivity[Video][CC]
Superconductivity in strongly correlated systems and flat-bands: bounds on T_c [Video][CC]

Afternoon Break

4:00pm Luca De' Medici (ESPCI Paris)
4:30pm Yuxuan Wang (Florida)
5:00pm All Participants
5:30pm

Departures from Fermi-liquid physics in Hund metals[Video][CC]
Mechanism and Properties of Charge-4e Superconductivity[Slides][Video][CC]
Discussion

RECEPTION

6:00pm

SPECIAL EVENTS DINNER

8:00pm

SHUTTLE TO BWSCI

Thursday, Sep 21, 2023

Probes of strange metallic behavior, Chair: Lara Benfatto (U Rome)

9:00am Erez Berg (Weizmann Inst.)
9:30am Andy Lucas (U Colorado-Boulder)
10:00am Thomas Devereaux (Stanford)
10:30am

A Criterion for Strange Metallicity in the Lorenz Ratio[Video][CC]
Spatially resolved transport of interacting electrons[Slides][Video][CC]
Transport in the Hubbard model - quantum Monte Carlo study[Video][CC]

Morning Break

11:00am Sankar Das Sarma (Maryland)
11:30am Rafael Fernandes (Minnesota)
12:00pm All Participants
12:30pm

Ordinary strangeness and mundane Planckian[Video][CC]
Non-Fermi liquid behavior in twisted nematic systems[Embargoed]
Discussion

Lunch 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.)**

