

KITP Conference: Strong Correlations and Unconventional Superconductivity: Towards a Conceptual Framework

(Sep 22-26, 2014)

Coordinators: Piers Coleman, J.C. Séamus Davis, Srinivas Raghu, Qimiao Si

Monday, Sep 22, 2014

Session: Overview and Challenges, Chair: Piers Coleman (Rutgers)

- 8:50am Lars Bildsten (KITP Director) Welcome
- 9:00am Xingjiang Zhou (IOP, CAS) ARPES on electronic structure and superconductivity of FeSe/SrTiO₃ films
- 9:45am Joe D. Thompson (LANL) Unconventional superconductivity and nearby states in correlated f-electron metals
- 10:30am **Morning Break**
- 11:00am T. Maurice Rice (ETH Zurich) The exotic pseudogap phase in the cuprates
- 11:45am Gabriel Kotliar (Rutgers) Strongly correlated superconductivity
- 12:30pm **Lunch Break**

Session: Iron-Based Superconductors, Chair: Roser Valentí (Univ. Frankfurt)

- 2:00pm Dunghai Lee (UCB) A simple effective theory for antiferromagnetically correlated superconductors
- 2:45pm Ming Yi (Stanford) Electron correlation trends in iron-based superconductors
- 3:30pm **Afternoon Break**

Session: Iron-Based Superconductors, Chair: Peter Hirschfeld (Univ of Florida)

- 4:00pm Hong Ding (IOP, CAS) Strong and local pairing in iron-based superconductors as seen by photoelectrons
- 4:45pm John Tranquada (BNL) Spin, orbital, and lattice correlations in iron chalcogenide superconductors
- 5:45pm **SHUTTLE TO BWSCI**

Tuesday, Sep 23, 2014

Session: Parallels and Insights from Cuprate & Organic Superconductivity, Chair: J. C. Seamus Davis (Cornell)

- 9:00am Patrick A. Lee (MIT) A new look at the pseudogap phase of the cuprates
- 9:45am Juan Carlos Campuzano (U. Illinois-Chicago) Energy Scales in Heavy Fermions

10:30am	Morning Break
11:00am Kazushi Kanoda (Tokyo)	Mott quantum criticality, pseudo-gap and superconductivity in triangular-lattice organics
11:45am Claude Bourbonnais (Sherbrooke)	Cooperative mechanisms for antiferromagnetism and pairing in low-dimensional organic superconductors
12:30pm	Lunch Break
Session: Quantum Criticality and Non-Fermi Liquid, Chair: Rebecca Flint (Iowa State)	
2:00pm Silke Paschen (TU Vienna)	Fermi surface reconstructions at heavy fermion quantum critical points
2:45pm Hilbert von Löhneysen (KIT)	Interplay of Kondo effect and geometric frustration in quantum-critical CePdAl
3:30pm	Afternoon Break
4:00pm Subir Sachdev (Harvard)	The microstructure of charge order in the cuprates, and implications for the pseudogap
4:45pm	Poster Session and Reception
6:00pm	SPECIAL EVENTS DINNER
8:30pm	SHUTTLE TO BWSCI

Wednesday, Sep 24, 2014

Session: Iron-Based Superconductors II

9:00am Thomas Maier (ORNL)	Pairing interaction near a nematic instability
9:45am Takasada Shibauchi (Tokyo)	Quantum criticality and BCS-BEC crossover in iron-based superconductors
10:30am	Morning Break

Session: Iron-Based Superconductors

11:00am Rong Yu (Renmin Univ.)	Electron correlations and multiorbital effects in iron pnictides and chalcogenides
11:45am Ian Fisher (Stanford)	Elastoresistance measurements as a probe of nematicity in Fe-arsenides and chalcogenides
12:30pm	Lunch Break

Thursday, Sep 25, 2014

Session: Contrasting Cuprate & Heavy Fermion Superconductivity, Chair: Catherine Pepin (CEA-Saclay)

9:00am	Steven Kivelson (Stanford)	Intertwined order
9:45am	Rebecca Flint (Iowa State)	Charge aspects of composite pairing in heavy fermion superconductors
10:30am		Morning Break
11:00am	Erwin Schubert (WMI)	YbRh ₂ Si ₂ at ultralow temperatures: Superconductivity and antiferromagnetism
11:45am	Milan Allan (ETH Zurich)	Imaging Cooper pairing of heavy fermions in CeCoIn ₅
12:30pm		Lunch Break

Session: Insights from Diverse Superconductors, Chair: Catherine Kallin (McMaster Univ.)

2:00pm	Douglas Scalapino (UCSB)	Doping asymmetry of the Emery CuO ₂ model
2:45pm	Eun-Ah Kim (Cornell)	Towards higher T _c topological superconductors
3:30pm		Afternoon Break
4:00pm	Jim Sauls (NWU)	Topological edge and surface states of superfluid ³ He and chiral superconductors
4:45pm	Daniel Agterberg (U. Wisconsin - Milwaukee)	Finite-momentum pairing states in non-centrosymmetric superconductors
5:30pm		RECEPTION
6:15pm		SPECIAL EVENTS DINNER
8:30pm		SHUTTLE TO BWSCI

Friday, Sep 26, 2014

Session: Iron-Based Superconductors III, Chair: Qimiao Si (Rice)

9:00am	Pengcheng Dai (Rice)	Spin nematic phase in the uniaxial-strained iron pnictides
9:45am	Philip Phillips (UIUC)	Orbital or spin physics in the iron-pnictide superconductors
10:30am		Morning Break
11:00am	Anna Böhrer (KIT)	Electronic nematic susceptibility of iron-based superconductors from shear-modulus measurements
11:45am	Kazuhiro Fujita (Cornell)	Atomic-scale physics of the d-form factor density wave in underdoped cuprates

12:30pm

Lunch Break

Session: Outlook, Chair: Chair: Elihu Abrahams (UCLA)

2:00pm Manfred Sigrist (ETH Zurich) Artificially structured superconductors: Loops, boundaries and interfaces

2:45pm Catherine Kallin (McMaster) Outlook for chiral superconductors

3:30pm

Afternoon Break

4:00pm Gil Lonzarich (Cambridge) Superconductivity without phonons: An update

5:45pm

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