Opportunities for PhD Research

Who are we?

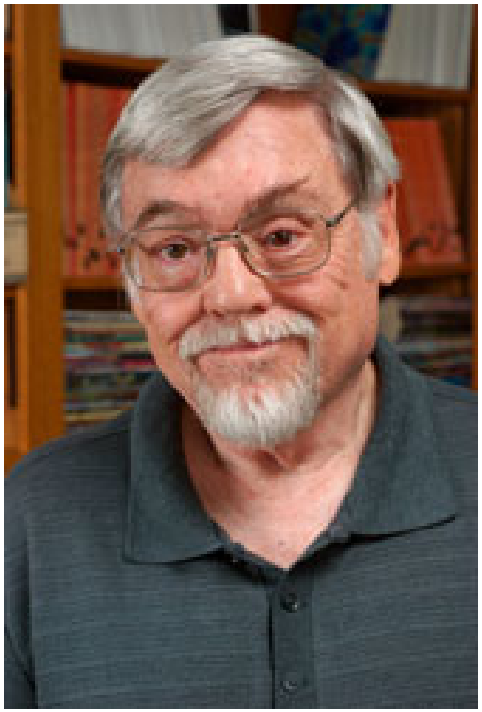
- We are a group of condensed matter theorists working on a wide variety of topics in hard and soft condensed matter physics.
- Our group has ten faculty members, along with several postdoctoral fellows and graduate students.
- We have strong collaborations with experimental condensed matter groups in the School of Physics and Astronomy.
- We are also involved in various national and international collaborations.
- **Applications from strong and motivated students are welcomed!**

Fiona Burnell

Understanding and engineering exotic phases of matter

- Topological phases of matter (fractional quantum Hall phases, spin liquids)
- Engineering fractional charge and statistics
- Criticality in topologically-ordered systems
- Symmetry-protected phases of matter (topological band insulators, interacting bosonic topological insulators)

Chuck Campbell



- Quantum & Classical Fluids
- Quantum & “Classical” Magnetism
- Many-Body Theory
- Statistical Mechanics.

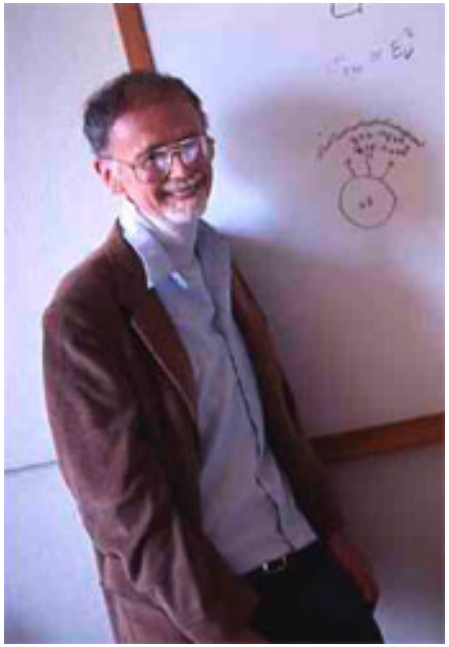
Andrey Chubukov

- High Tc superconductors: cupares, iron-based, …
- Quantum magnetism
- Strongly correlated electron systems
- Quantum critical phenomena

Rafael Fernandes

- Unconventional superconductors (mostly iron pnictides and cuprates)
- Emergent electronic liquid-crystalline phases (nematics, smectics)
- Competing orders in quantum materials
- Transport in strongly correlated

Woods Halley



- Transport and nonequilibirum processes in solids and fluids using theoretical, simulation and experimental methods
- Studies of electrode-electrolyte interfaces
- Studies of the interaction of vapor pulses with Bose-Einstein condensed helium four liquid and alkali gases.
- Chemical kinetic studies of models of prebiotic evolution

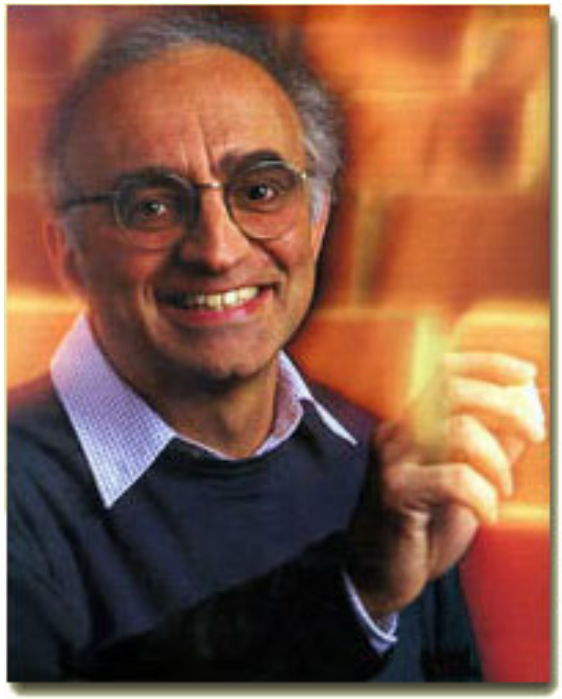
Alex Kamenev

- Disordered systems and glasses
- Field-theoretical treatment of many-body systems
- Bose condensates in cold atoms
- Mesoscopic and out of equilibrium systems
- Population dynamics

Natalia Perkins

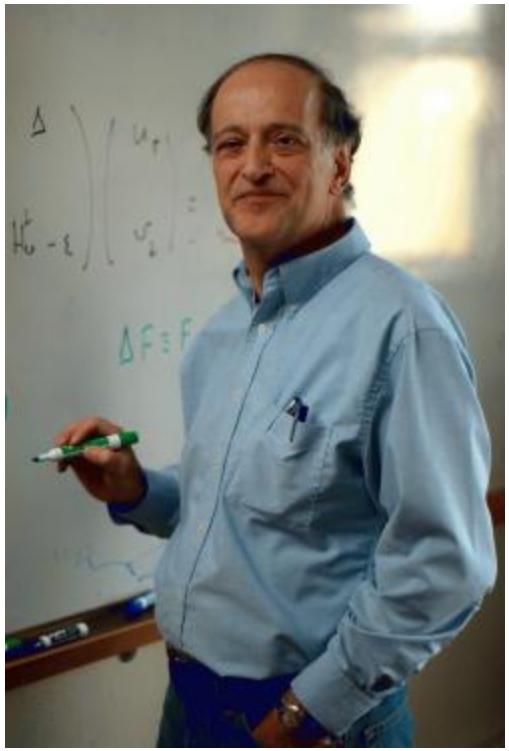
- Strongly correlated electron systems
- Transition metal oxides
- Frustrated magnets and topologically non-trivial magnetic states
- Phase Transitions

Boris Shklovskii



- Theory of transport and electron-electron correlations in disordered systems, quantum Hall effect, hopping conduction and metal-nonmetal transition.
- Theory of screening of DNA and other macro-ions by multivalent ions: charge inversion. Theories of transport of ions and DNA through ion channels. Theory of virus self-assembly.

Oriol Valls



- Superconducting and Magnetic Proximity Effects in F/S nanostructures
- Exotic forms of superconductivity;
- Charge and Spin Transport in F/S nanostructures;
- Superfluid Hydrodynamics; Dynamics of quantum Crystals

Jorge Vinals

- Nonequilibrium phenomena: nonlinear dynamics, pattern formation, and chaos
- Soft Matter transport and response: nematic suspensions and chromonic phases, and modulated phases in copolymers.