Probing Spin Liquids via Spin Transport

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Abstract

In the “spinon Fermi sea” state proposed for the organic spin liquid candidates, there is a Fermi surface of fermionic spin-1/2 spinons. Specific heat and thermal conductivity measurements indeed suggest the existence of Fermi surfaces in these Mott insulators. However, they do not directly prove these Fermi surfaces are formed by the spinons. In this talk, we propose a measurement that would simultaneously show the existence of Fermi surfaces and their spin-carrying nature. Our proposal is to measure the spin current flowing through a metal-spin liquid-metal junction, similar to a recent measurement of spin current through a ferrimagnetic insulator. We will show that different Mott insulating states can in principle be distinguished by different power law relations between spin current and spin bias in this setup.

About the speaker

Prof Fa Wang obtained his PhD at the University of California, Berkeley in 2009. He was a postdoctoral fellow at the Massachusetts Institute of Technology during 2009-2012. His main research interest includes strongly correlated electron systems, frustrated magnetism, quantum spin liquids, and iron-based high temperature superconductivity.