Qimiao Si

Rice University

Electron Correlations and Unconventional Superconductivity

This talk comprises two parts. I will start by briefly discussing the developments on quantum critical heavy fermion metals and superconductors, and the accompanying interactions with Piers Coleman. The bulk of the talk will be devoted to several representative aspects of the physics about the iron-based superconductors. On the normal state, the issues to be considered include the nature of the magnetic and nematic orders and their fluctuations, and the orbital-selectivity of the electron correlations. On the superconducting state, the focus will be on the interplay between magnetically-driven multiorbital pairing and the electronic nematic order, particularly in FeSe. I will summarize these issues and discuss their implications for the overall understanding of the iron-based superconductors.