Tuning the Ground State of Fe Pnictide Superconductors

Ni Ni
University of California, Los Angeles

Searching for new superconductors and differentiating the key factors impacting Tc are at the core of research in superconductivity. Recently, Fe-based superconductors, the second high temperature superconductor family besides the cuprates, have been discovered to show Tcs up to 55 K. The interplay of the magnetism, superconductivity and structure in Fe-based superconductors makes them a great platform for understanding unconventional superconductivity. In this colloquium, the temperature-dopant concentration (T-x), temperature-extra electrons (T-e), and temperature-pressure (T-P) phase diagrams of the Ba(Fe1-xTMx)2As2 series will be presented. Quantitative analysis of the comparison will be discussed and recent ARPES measurements will be presented to show how electron doping leads to superconductivity in this system. I will also present the effect of doping on the recently discovered, structurally and chemically similar Fe pnictide, Ca10(Pt3As8)(Fe2As2)5 (the “10-3-8 phase”) and Ca10(Pt4As8)(Fe2As2)5 (the “10-4-8 phase”) compounds and discuss the possible role of metallic spacer layers in this system.