



Invitation

LMU-Seminar

Title: Phase mixture and pseudogap like behavior in the bismuthate high- T_c superconductors
Speaker: Dr. Muntaser Naamneh
Spectroscopy of Novel Materials Group, PSI
Time: Monday, December 17th 2018, 10:00
Place: WBGB/019

Abstract:

Coupling between electrons and phonons can play a major role in defining novel phases in condensed matter physics. In the weak coupling regime, it is well understood that these interactions are essential for the formation of electron pairs that enable conventional superconductivity. However, beyond the weak coupling regime, the consequences of electron-phonon interactions in the many-body theory remain ambiguous. Here we investigate strong electron-phonon coupling in the bismuthate superconductor compound $Ba_{1-x}K_xBiO_3$. In the insulating parent compound, phonons dress the charges to form a lattice of frozen polarons. By doping with holes, the long-range ordering of the polarons becomes disrupted, and eventually, superconductivity emerges. We have tracked both the evolution of the electronic structure and the electron-phonon coupling as a function of doping using angle-resolved photoemission and resonant inelastic X-ray scattering. The results indicate that while the electron-phonon coupling strength is virtually constant, a remnant of the parent compound electronic phase correlation persists above the superconducting phase and showing pseudogap behavior. These results present a challenge to existing theories and give a new perspective in the role of the parent compound interaction in defining the superconductor state.