

Visualizing phase-separation by Micro-ARPES and Nano-ARPES

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Phase separation is characteristic for correlated electron systems, e.g. high temperature superconductors, manganites, charge density waves etc. Revealing the electronic structure of each individual domain (namely, with spatial resolved information as in a microscope) is critical for understanding the fundamental physics, yet experimentally it has been a grand challenge. So far, the large beam size of conventional ARPES has often led to domain-averaged electronic structure with limited information about the intrinsic physics. By focusing the beam size down to micrometer or hundred nanometer scale, Micro-ARPES and Nano-ARPES provide unique capability for accessing the electronic structure of each individual phase-separated region, allowing direct visualization of the phase-separated regions with both energy, momentum and spatial resolved information. Here I will present our recent progress on the electronic structure of phase separated materials using home built laser-based Micro-ARPES and synchrotron-based Nano-ARPES.