Visualization of electronic nematicity in the iron pnictides

ETHAN ROSENTHAL, Columbia University

The nematic state from which superconductivity emerges in the iron pnictides continues to confound. We use scanning tunneling microscopy (STM) and spectroscopy (STS) to image both long-range nematic order and nematic fluctuations across the doping phase diagram in Co-doped NaFeAs. We associate twinning domains with long-range order and directly visualize the temperature and doping dependence of these features. Anisotropic electronic structure is found to persist outside of the ordered nematic phase. With the aid of a novel experimental setup which combines simultaneous STS and variable, uniaxial strain, we determine the relationship between strain and nematic fluctuations which gives rise to the anisotropy.