Sergey Borisenko

IFW, Dresden, Germany

True scale of nematic ordering in Fe-based superconductors from ARPES

Nematicity plays an important role in the physics of iron-based superconductors (IBS). Its microscopic origin and whether it is important for the mechanism of the high-temperature superconductivity itself is highly debated. A crucial knowledge in this regard is the degree to which the nematic order influences the electronic structure of these materials. Earlier angle-resolved photoemission spectroscopy (ARPES) studies found that the effect is dramatic in three families of IBS including 11, 111 and 122 compounds: energy splitting reaches 70 meV and Fermi surface becomes noticeably distorted. More recent experiments, however, reported significantly lower energy scale in 11 and 111 families, thus questioning the degree and universality of the impact of nematicity on the electronic structure of IBS. I will address these results and revisit the electronic structure of the parent for 122 family compound, BaFe2As2. Our systematic ARPES study including the detailed temperature and photon energy dependencies points to the significantly smaller energy scale also in this family of materials, thus establishing the universal scale of this phenomenon in IBS. Our results form a necessary quantitative basis for theories of high-temperature superconductivity focused on the nematicity.