The mechanism for magnetic and structural transitions in iron-based superconductors and parent compounds

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One of the mysteries in iron-based high-temperature superconductors and their parent compounds is that a spin density wave transition is always accompanied by a structural transition. The ubiquitous appearance of the magnetic and structural transitions in various families of iron-based systems makes it crucial to understand their nature and origin.

In the talk, I will present our recent angle resolved photoemission data on the electronic structure of NaFeAs, LaOFeAs, $Fe_{1+y}Te$, and Ba/Sr/Eu-Fe_2As_2. Our results show that it is the electronic structure reconstruction rather than the Fermi surface nesting that drives both the structural and magnetic transitions in these compounds. Moreover, we show that electron correlations play a very important role, and induce different manifestation of such a mechanism in different compounds.