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orbital selective correlation reduce in collapse tetragonal phase of $CaFe_2(As_{0.935}P_{0.065})_2$ and electronic structure reconstruction studied by angel resolved photoemission spectroscopy LINGKUN ZENG, Chinese Academy of Sci (CAS) — We performed an angle-resolved photoemission spectroscopy (ARPES) study of the $CaFe_2(As_{0.935}P_{0.065})_2$ in the collapse tetragonal(CT) phase and uncollapse tetragonal(UCT) phase. We find in the CT phase the electronic correlation dramatically reduces respective to UCT phase. Meanwhile, the reduction of correlation in CT phase show an orbital selective effect: correlation in d_{xy} reduces the most, and then $d_{xz/yz}$, while the one in $d_{z^2-r^2}$ almost keeps the same. In CT phase, almost all bands sink downwards to higher binding energy, leading to the hole like bands around Brillouin zone(BZ) center sink below E_F compared with UCT phase. However, the electron pocket around Brillouin Zone(BZ) corner(M) in UCT phase, forms a hole pocket around BZ center(Z point) in CT phase. Moreover, the d_{xy} exhibits larger movement down to higher binding energy, resulting in farther away from $d_{yz/xz}$ and closer to d_{xy}.We propose the electron filling ,namely high spin state in UCT phase to low spin state in CT phase(due to competing between crystal structure field and Hund's coupling), other than the Fermi surface nesting might be responsible for the absent of magnetic ordering.

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