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The realization of nematic order in iron-pnictide superconductors

HONG-YI CHEN, CHUNG-PIN CHOU, National Taiwan Normal University, C. S. TING, University of Houston — The interplay between the nematicity and superconductivity in iron-pnictide is studied with a proposed magnetic configuration in a microscopic model. The spin-driven order in the nematic state has been found in a small area in the electron-doped regime. In the nematic state, in the normal state, the broken degeneracy of the orbitals d_{xz} and d_{yz} causes the elliptic Fermi surface. In the state where the nematicity coexists with the superconductivity, an orthorhombic magnetic fluctuations appears and its Fourier transformation shows two uneven pairs of peaks at $(\pm\pi, 0)$ and $(0, \pm\pi)$. Finally, two modulated stripe SDW perpendicularly intertwined each other and makes the charge density and the spatial distribution of the LDOS reflecting a $d_{x^2-y^2}$ -symmetry form factor.

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