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Interplay between accidental gap nodes and nematic order in iron-based superconductors JIAN KANG, University of Minnesota, ALEXANDER KEMPER, Lawrence Berkeley National Lab, RAFAEL FERNANDES, University of Minnesota — In some iron-based materials, long-range nematic order coexists with superconductivity – either via a spontaneous tetragonal symmetry-breaking taking place at temperatures above T_c or via application of a small external uniaxial strain to detwin the sample. Here we discuss the impact of nematic order on the anisotropic properties of the superconducting state, focusing on the particular case where accidental nodes are present at the electron pockets. Using both a 5-orbital tight-binding model and a phenomenological 3-band model, we investigate how the d_{xz}-d_{yz} orbital order triggered by nematic order affects the magnetically-mediated pairing interaction and the gap structure. We find that proximity between s and d superconducting instabilities enhances the effects of nematic order, which may even lift the nodes in one of the electron pockets. We also compute thermodynamic properties in the nematic- superconducting state, such as the penetration depth and the thermal conductivity, and discuss its experimental manifestations.

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