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Competing orders in Fe-based superconductors: a parquet renormalization group study of the full 4-pocket, 3-orbital low energy effective model. RUI-QI XING, University of Minnesota, LAURA CLASSEN, Heidelberg University, Germany, MAXIM KHODAS, The Hebrew University, Israel, ANDREY CHUBUKOV, University of Minnesota — In Fe-based superconductors, superconductivity, magnetism and nematic orders are all observed. Understanding various competing orders in Fe-based superconductors may help to unveil the mechanism of high-temperature superconductivity. To understand these competing orders appeared in the phase diagram, we use parquet renormalization group, an unbiased approach, to study the full four-pocket, three-orbital low-energy model for Fe superconductors. We identified all symmetry-allowed interactions, derived and analyzed the RG flow of the couplings and susceptibilities, and obtained the hierarchy of competing instabilities. For parameters relevant to FeSe, we argue that the nematic order parameter has three components, and we found particular relations between these components. Our results are consistent with recent ARPES experiments [A. Fedorov et al, arxiv:1606.03022].

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