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Microscopic Mechanism for a Pairing State with Time-Reversal Symmetry Breaking in Iron-Based Superconductors WERNER HANKE, Theoretical Physics, University of Würzburg, SHOU-CHENG ZHANG, Department of Physics, Stanford University, CHRISTIAN PLATT, Theoretical Physics, University of Würzburg, RONNY THOMALE, Department of Physics, Stanford University — The multipocket Fermi surfaces of iron-based superconductors promote pairing states with both s± -wave and dx2-y2 -wave symmetry. We argue that the competition between these two order parameters could lead to a time-reversal-symmetry breaking state with s + id-pairing symmetry in the iron-based superconductors, and propose serveral scenarios in which this phase may be found. To understand the emergence of such a pairing state on a more rigorous footing, we start from a microscopic 5-orbital description representative for the pnictides. Using a combined approach of functional renormalization group and mean-field analysis, we identify the microscopic parameters of the s + id-pairing state. There, we find the most promising region for s + id-pairing in the electron doped regime with an enhanced pnictogen height.

[1] arXiv:1106.5964v1

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