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Quantum Monte Carlo study of a dominant s-wave pairing symmetry in iron-based superconductors TIANXING MA, Department of Physics, Beijing Normal University/ Beijing Computational Science Research Center, HAI-QING LIN, Beijing Computational Science Research Center, JIANPING HU, National Laboratory for Condensed Matter Physics, Institute of Physics, CAS, China/Department of Physics, Purdue University USA — We perform a systematic quantum Monte Carlo study of the pairing correlation in the S_4 symmetric microscopic model for iron-based superconductors. It is found that the pairing with an extensive s-wave symmetry robustly dominates over other pairings at low temperature in reasonable parameter region regardless of the change of Fermi surface topologies. The pairing susceptibility, the effective pairing interaction and the $(\pi, 0)$ antiferromagnetic correlation strongly increase as the on-site Coulomb interaction increases, indicating the importance of the effect of electron-electron correlation. Our non-biased numerical results provide a unified understanding of superconducting mechanism in iron-pnictides and iron-chalcogenides and demonstrate that the superconductivity is driven by strong electron-electron correlation effects.

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