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**Two-band Model for Unconventional Superconductivity in Iron-Based Superconductors** YAN CHEN, (1) Dept. of Physics and Lab of Advanced Materials, Fudan University (2) Texas Center for Superconductivity, Univerisity of Houston — The recent discovery of FeAs superconductors with high Tc has triggered intensive efforts to explore magnetism and superconductivity in this family of materials. We adopt an effective model Hamiltonian including a two-band tight-binding term as well as a spin-spin exchange interactions term. The first term can fit approximately the multi-band dispersions near electron/hole Fermi-pockets while the second term may lead to the appropriate superconducting pairing symmetry as well as the SDW state at low doping. Different pairing symmetry candidates of FeAs materials are evaluated for various model parameters. In particular, we study the local electronic structure at vortex cores in the system subject to an external magnetic field. The relevance to recent STM measurements will be discussed. Moreover, we calculate the tunneling conductance of various superconducting junctions, including the Josephson currents and the Andreev reflection, between the FeAs materials modeled by a two-band superconducting state and various systems include normal metal, a conventional s-wave superconductor, d-wave superconductor, or same FeAs materials. The Josephson current can be decomposed into two parts, an interband and an intraband components. Distinct interference effects can be used to distinguish the pairing symmetry of FeAs system.

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