SPIN-TRIPLET PAIRING INDUCED BY HUND'S RULE EXCHANGE IN ORBITALLY DEGENERATE SYSTEMS: HARTREE-FOCK APPROXIMATION

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Spin-triplet pairing induced by the Hund's rule exchange was proposed some time ago, as well as its coexistence/competition with the ferromagnetic and orbital types of ordering within simplified models. In this work we include the effect of interband hybridization and treat the problem by starting from an extended Hubbard model for doubly degenerate band and making the simplest Hartree-Fock approximation for the parts involving the pairing and the Hubbard terms. The conditions of stability of various phases are determined as a function of both band filling and microscopic parameters. The phase diagram contains regions of stability of the spin-triplet superconducting phase coexisting with either saturated or non-saturated ferromagnetism. For comparison, phase diagram for the cases of constant density of states and that of square lattice, have been presented. The influence of hybridization on the stability of considered phases as well as the temperature dependence of magnetic moment and the superconducting gap is also provided.

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