

Critical temperature of a non-centrosymmetric s-wave superconductor

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There is an overwhelming agreement that the superconducting state of a non-centrosymmetric superconductor represents a mixture of singlet and triplet states [1], however theoretically predicted dependence of these two states on the strength of the symmetry breaking spin-orbit coupling seems to be entirely different: whereas the spin triplet states are strongly suppressed, the spin singlet states are very weakly influenced by this interaction [2]. We reexamine the issue of the non-centrosymmetric singlet superconductivity in a system with the spin-orbit coupling dependent density of states. Focussing on the s-wave superconducting state we evaluate the critical temperature in the tight-binding model and communicate a general tendency of T_c to be suppressed by the anisotropic spin-orbit coupling but for systems close to the half filling a sharp maximum in the critical temperature for weak pairing potentials is reported.

References:

- [1] Lecture Notes in Physics **847**, Non-centrosymmetric Superconductors, ed. E. Bauer, M. Sigrist (Springer, 2012)
- [2] P. A. Frigeri, D. F. Agterberg, A. Koga, and M. Sigrist, Phys. Rev. Lett. **92**, 097001 (2004)