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Coexistence of spin density wave and triplet superconductivity in quasi-one-dimensional Bechgaard salts WEI ZHANG, CARLOS SA DE MELO, Georgia Institute of Technology — The interplay between magnetic order and superconductivity is a very important problem in condensed matter physics. In the quasi-one-dimensional (quasi-1D) organic conductor $(TMTSF)_2PF_6$, an antiferromagnetic state charaterized by a spin density wave (SDW) order neighbors a triplet superconducting (TSC) state on the pressure-temperature phase diagram. Experiments [1,2] suggest a coexisting region of SDW and TSC orders in the vicinity of the phase boundary. We consider a tight-binding quasi-1D electron system, and construct the Ginzburg-Landau (GL) free energy with two order parameters. In the absence of a magnetic field, the rotational symmetry of this system is broken due to spin anisotropy and spin-orbit coupling. Thus, the GL free energy has a similar form as the ordinary ϕ_1-ϕ_2 model, except additional gradient terms. We calculate the GL coefficients microscopically and obtain a phase diagram in zero magnetic field. This phase diagram shows a coexistence region for SDW and TSC.
Reference:
[1] T. Vuletic *et al.*, Eur. Phys. J. B **25**, 319 (2002).
[2] I. J. Lee *et al.*, Phys. Rev. Lett. **94**, 197001 (2005).

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