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Non-uniform Triplet Superconductivity in Low-Dimensional Conductors.

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The interplay between magnetic and superconducting orders 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) neighbors a triplet superconducting (TSC) state in the P-T phase diagram. Experiments [1,2] suggest a coexistence region of SDW and TSC orders in the vicinity of the phase boundary. We consider a tight-binding quasi-1D electron system, and derive the Ginzburg-Landau (GL) free energy for simultaneous SDW and TSC orders. By solving the linearized GL equations in the limit where the coupling between SDW and TSC order parameters is small, a non-uniform TSC state appears with simultaneous non-uniform SDW order.

References:

[1] T. Vuletic *et al.*, Eur. Phys. J. B **25**, 319 (2002).
[2] I. J. Lee *et al.*, Phys. Rev. Lett. **94**, 197001 (2005).