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Vortex structure in p-wave superconductors

We study vortices in p-wave superconductors in a Ginzburg-Landau setting. The state of the superconductor is described by a pair of complex wave functions, and the p-wave symmetric energy functional couples these in both the kinetic (gradient) and potential energy terms, giving rise to systems of partial differential equations which are nonlinear and coupled in their second derivative terms. We prove the existence of energy minimizing solutions in bounded domains $\Omega \subset \mathbb{R}^2$, and consider the existence and qualitative properties (such as the asymptotic behavior) of equivariant solutions defined in all of \mathbb{R}^2 . The coupling of the equations at highest order changes the nature of the solutions, and many of the usual properties of classical Ginzburg-Landau vortices either do not hold for the p-wave solutions or are not immediately evident. These results were obtained in joint work with L. Bronsard and X. Lamy.