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Ginzburg-Landau vortices: dynamics, pinning, and hysteresis. (English) Zbl 0888.35054

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There are considered three problems related to the mathematical theory of vortex phenomena in superconductivity based on the Ginzburg-Landau models. First, it is studied the long-time behaviour of solutions to the time dependent Ginzburg-Landau equations. Then, it is considered the pinning effect of thin regions in a variable thickness thin film. Finally, it is proved the existence of vortex-like solutions to the steady state Ginzburg-Landau equations, and the hysteresis phenomenon near the lower critical field is studied.

Reviewer: A.Pankov (Vinnitsa)

MSC:

35K60 Nonlinear initial, boundary and initial-boundary value problems for linear parabolic equations Cited in 27 Documents

35A20 Analyticity in context of PDEs

82D55 Statistical mechanics of superconductors

35B40 Asymptotic behavior of solutions to PDEs

35J65 Nonlinear boundary value problems for linear elliptic equations

Keywords:

vortex pinning; hysteresis

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