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Numerical Methods for Simulating Ginzburg-Landau Vortices

Mu, Mo; Deng, Yuefan; Chou, Chung-Chiang

Abstract

Numerical solution to the Ginzburg-Landau (GL) equation becomes infeasible as the GL parameter κ and the number of GL vortices increase to a physically interesting regime. It is in this regime that we focus our attention to design a simulated annealing approach for minimizing the associated renormalized energy to study the GL vortex configurations. This approach applied to a commonly used model produces vortex configurations which are of interest in recent studies.

Key words : Ginzburg-Landau vortex; Numerical PDE solution; Renormalized energy; Simulated annealing