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Vortices in Ginzburg-Landau Systems

The Ginzburg-Landau model is a popular and successful variational principle in physics, for describing phenomena such as superconductivity, superfluidity, and Bose-Einstein condensation. It is no less remarkable for its mathematical features, in particular the quantized vortices which characterize its minimizing states. In this talk, I will discuss some PDE problems associated with Ginzburg-Landau vortices, which arise in characterizing all solutions which are "locally minimizing" in an appropriate sense (due to De Giorgi.) I will compare the results on the original Ginzburg-Landau model with a more complex, two-component Ginzburg-Landau system where more interesting vortex core structures are possible.