On the dynamics of Ginzburg-Landau vortices on a Riemannian Manifold

Antonio Segatti
University of Pavia
antonio.segatti@unipv.it

We consider a Ginzburg-Landau energy defined for vector fields u on a 2 dimensional closed Riemannian manifold. The Ginzburg-Landau energy depends on a small parameter $\varepsilon > 0$ that favors configurations with $|u| = 1$. It is has been recently proved by R. Jerrard & R. Ignat that under appropriate hypothesis, as $\varepsilon \to 0$, a finite number of point vortices emerges. The number and the topological charges of the vortices are related to the topology of the manifold. Moreover, the positions of the vortices is governed by the so called renormalized energy. The goal of the talk is to show that the vortices move, as in the two dimensional euclidean case, according to the gradient flow of the renormalized energy. More precisely, we prove that the gradient flow of the renormalized energy emerges as the Γ-*convergence of gradient flows* (in the sense of E. Sandier & S. Serfaty) limit of the gradient flow of the Ginzburg-Landau energy. This is a joint work with G. Canevari (Verona).