

Effective dynamics of magnetic vortices

STEPHEN GUSTAFSON

ETH-Zuerich

Ginzburg-Landau equations are nonlinear PDEs arising in many areas (superconductors, superfluids, particle physics). A basic qualitative feature of their solutions is the presence (and dynamics) of localized, topological structures called vortices. We show that solutions (with appropriate initial data) are well-described for long times as a collection of moving vortices, and we identify the dynamical system which describes (to leading order in the vortex separation) the motion of the vortex centres. Once certain spectral properties of an associated linearized operator are established, the argument is quite general. This is joint work with I.M. Sigal.