Magnetic vortex rings and knots

Paul-Michael Sutcliffe, Durham University

Mots-clés :

Résumé : The dynamics of a three-dimensional ferromagnet may be modelled by the Landau-Lifshitz equation. I shall present some solutions of this equation that have a topological characterization (the Hopf charge) and describe magnetic vortex rings that propagate along their symmetry axis, like smoke rings. A modification of this system, due to Faddeev, allows static solutions carrying Hopf charge, which naturally form links and knots. I shall discuss these solutions and how they may be approximated by elastic rods, yielding an extension of the classical Kirchhoff rod energy.

Paul-Michael Sutcliffe, Durham University, Dept. of mathematics
`p.m.sutcliffe@durham.ac.uk`