

Magnetic hopfions in toroidal nanostructures driven by an Oersted magnetic field

- Castillo-Sepúlveda S.^a,
- Cacilhas R.^b,
- Carvalho-Santos V.L.^b,
- Corona R.M.^c,
- Altbir D.^c

Abstract

The search for magnetic hopfions has been the focus of intense research during the last years. In this direction, and using micromagnetic simulations, we studied the magnetization reversal mechanism in toroidal nanoparticles under the action of an Oersted magnetic field. Our results evidence the nucleation of four magnetic configurations as a function of geometry, two of them being hopfion-like textures. These mechanisms are preferred for large toroidal structures. The annihilation of such texture is indicated by strong changes in the energy, which characterizes a topological transition. © 2021 American Physical Society.