

# Hopf solitons in a toy model for ferromagnets

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The Hopf index of a (sufficiently rapidly decaying) smooth map  $\mathbb{R}^3 \rightarrow \mathbb{S}^2$  is an integer-valued topological invariant that can be interpreted as linking number. It is an open question whether Hopf solitons, i.e. stable magnetization configurations with nonzero Hopf index, may exist in ferromagnetic materials.

In this talk, we will first review the approaches of Esteban and Lin/Yang to establishing existence of topologically nontrivial minimizers in the three-dimensional Skyrme and Faddeev models. Then, we will discuss existence of minimizers in a toy model for ferromagnets with higher-order exchange interaction, subject to a nonzero Hopf index.

*This is joint work with Christof Melcher.*

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