

# Higher degree minimizers in the magnetic skyrmion problem

Theresa Simon (Universität Münster)

In extremely thin ferromagnetic films, an additional interaction, the so-called Dzyaloshinskii-Moriya interaction (DMI), arises in the micromagnetic energy. In such materials, topologically nontrivial, point-like configurations of the magnetization called magnetic skyrmions are observed, which are of great interest in the physics community due to possible applications in high-density data storage.

We will discuss the problem of characterizing skyrmions in the setting of bounded domains with Dirichlet data. For single skyrmions, we resolve this question by describing them in the regime of dominating exchange (or Dirichlet) energy. As in this limit skyrmions collapse into a point, we rely on a quantitative rigidity result for degree 1 harmonic maps into the two-dimensional sphere. Turning to the much harder problem of multiple skyrmions, we demonstrate existence of higher degree minimizers.