

## **Magnetic skyrmions in extremely thin films**

*Theresa Simon (WWU Münster)*

Magnetic skyrmions are nanoscale, topological solitons observed in thin magnetic films. Due to possible data storage applications, they are of great interest to the physics community. Typically thought of as stabilized by the so-called Dzyaloshinskii-Moriya interaction occurring in extremely thin films, it has been demonstrated that they may also arise due to stray field effects.

I will discuss the modeling of skyrmions as local minimizers of 2D reductions of the micromagnetic energy and describe their behavior in the limit of dominating Dirichlet energy. As in this limit, skyrmions collapse into a point, the analysis relies on a rigidity estimate for degree  $\pm 1$  harmonic maps from the plane to the sphere. One consequence of our analysis is the theoretical possibility of skyrmions smaller than the film thickness, requiring more care in the dimension reduction process, which turns out to have implications on the existence of stray field stabilized skyrmions.