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The cross-over from symmetric to asymmetric transition layers in a nonlocal and nonconvex variational model.

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SUMMARY

We study the Landau-Lifshitz model for the energy of multi-scale transition layers in thin ferromag- netic

lms. Our main result is the rigorous derivation of a reduced model for the energy of the optimal transition layer, based on Gamma-convergence. The minimal energy splits into a contribution from an asymmetric, divergence-free core, and a contribution from two symmetric, logarithmically decay- ing tails. The contribution from the symmetric tails is computed explicitly, while the asymmetric core is analyzed via the harmonic map problem for S^2-vector

elds satisfying a divergence constraint. As a consequence, we describe the bifurcation phenomenon from symmetric to asymmetric transition layers. This is a joint work with Lukas Doering and Felix Otto (Max-Planck Institute, Leipzig).

Keywords: ferromagnetic materials, Landau-Lifschitz equations, multiscale efects

AMS Classification:

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