[Thin-film Γ-limit of the micromagnetic free energy

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abstract: The asymptotic behavior of the micromagnetic free energy governing a ferromagnetic film is studied as its thickness gets smaller and smaller compared to its cross section. Here the static Maxwell equations are treated as a Murat's constant rank PDE constraint on the energy functional. In contrast to previous work this approach allows to keep track of the induced magnetic field without solving the magnetostatic equations. In particular, the mathematical results of Gioia and James [*Proc. R. Soc. Lond. A* 453 (1997), pp. 213–223] regarding convergence of minimizers are extended by giving a full characterization of the corresponding Γ-limit.