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Domain structure and hysteresis in bulk ferromagnetic magnets with external fields.

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SUMMARY

We investigate the ground state of a uniaxial ferromagnetic plate with perpendicular easy axis and subject to an applied magnetic field normal to the plate. Our interest is the asymptotic behavior of the energy in macroscopically large samples near the saturation field. We establish the scaling of the critical value of the applied field strength below saturation at which the ground state changes from the uniform to a branched domain magnetization pattern and the leading order scaling behavior of the minimal energy. We also derive a reduced sharp-interface energy which gives the precise asymptotic behavior critical field under some a physically reasonable assumptions. This is joint work with Cyril Muratov.

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

AMS Classification: .

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