

Internal Structure of Two-Dimensional Domain Walls in Finite Bulk Crystals

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The two-dimensional structure of a 180° Bloch-type interdomain boundary in the near-surface region of bulk crystals of finite thickness is derived by an approximate analytic solution of the constitutive micromagnetic equations. The symmetrical equilibrium wall structure is characterized by an extensive flux closure internal to the crystal and a compressed charge distribution on the crystal surface. It is found that the magnetostatic energy term is the principal stabilizing factor that prevents a 180° Bloch wall, even in non-magnetostrictive materials, from structural decomposition into two adjacent 90° walls.