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Ground States in Thin Ferromagnetic Nanorings with Four-Fold In-Plane Anisotropy GABRIEL CHAVES-O'FLYNN, CYRILL MURATOV, New Jersey Institute of Technology — We present results of micromagnetic simulations based on the optimal grid algorithm for the study of metastable states in thin nano-rings with four-fold anisotropy. Previous work have demonstrated a rich energy landscape for these structures resulting from competition between shape and crystalline anisotropies [1]. We present a quasi-1D framework for the analysis of nanorings. First, we calculate the energy of domain walls of different windings for magnetic strips oriented at different angles with respect to the easy anisotropy axes. We consider the dependence of wall energy on material parameters. With these numbers we build a reduced-model for the micromagnetic energy on the rings which allows to treat the micromagnetic energy minimization as a combinatorial problem: the walls in the ring are treated as separate entities each with an intrinsic energy calculated from the strip case and interacting with each other via dipole-dipole interactions. A comparison with the phase diagram for ground states provides information on the limits of validity of this simplified model. [1] G.D. Chaves-O'Flynn, C. Muratov. IEEE Trans. Mag. 49, p. 3125 (2013) [2] C. Muratov and V. Osipov. IEEE Trans. Mag, 45, p.3207 (2008)

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