Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Energy Minimizers in Thin Ferromagnetic Nanorings with Four-Fold In-Plane Anisotropy[1] GABRIEL CHAVES, CYRILL MURATOV, New Jersey Institute of Technology — We present results obtained from micromagnetic simulations of thin ferromagnetic nanorings. We investigate annuli made of materials with non-negligible cubic anisotropy. In thin films the crystalline anisotropy favors magnetizations lying in the film plain along $\pm\hat{\mathbf{x}}$ or $\pm\hat{\mathbf{y}}$ directions. The magnetostatic energy separates into boundary and bulk terms. Our previous work provided a classification of remanent states based on the above contributions to the energy [1]. There are three regimes with distinct features of the remanent states depending on the dominant energy term. The magnetization configurations present four distinct domains. Different remanent states coexist in each of these regimes and they are characterized by the behavior of the domain walls spanning the annulus. Here, we compute the energies for these metastable states in a variety of ring dimensions and material parameters. In particular, we attempt to locate the ground state as a function of ring dimensions. This information is of importance for the design of magnetic storage devices based on configurations presenting 2π domain walls [2]. [1] G.D. Chaves-O'Flynn, C. Muratov. Submitted. IEEE Trans. Mag. [2] C. Muratov and V. Osipov. IEEE Trans. Mag, 45, p.3207 (2008)

[1]NSF DMS-0908279

Gabriel Chaves
New Jersey Institute of Technology

Date submitted: 09 Nov 2012 Electronic form version 1.4