Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Phase Diagram of Equilibrium Domain-Wall Solutions in Finite-Size ECC Media SONALI MUKHERJEE, Seagate Technology, LUC BERGER, Carnegie Mellon University — Reversal in ECC media where hard and soft anisotropy magnetic material are exchange coupled has been studied because it has high thermal stability with low reversal field. Using Euler-Lagrange condition, we have studied the field evolution of domain-wall solutions in ECC for various anisotropy ratios of hard and soft phase and soft-phase length scales. We find that there exist 3 critical fields. At the field H1s, the domain-wall solution Es (surface domain-wall) and E1(soft-phase domain-wall) start existing. The nucleation field Hn,is the field where the energy of Es and the unreversed uniform solution E0 coincide. Above Hn, Es ceases to exist. The domain-wall propagation field Hdw is the field where the energy of soft domain wall E1 and hard domain wall E2 coincide. Above Hdw, E1 and E2 cease to exist. The reversal field is the field at which no domain-wall solutions exist anymore and is the maximum of Hn and Hdw fields. The field Hn is found to reduce with increasing soft-phase length ls, and Hdw is found to be independent of ls for ls greater than eh where eh is the domain- wall width of the hard phase. For hard/soft anisotropy ratio kh/ks less than 5, the nucleation field is always dominant. When kh/ks is greater than 5, there exits a soft-phase length lsc, at which the fields Hn and Hdw become equal. When ls is greater than lsc, Hdw dominates the reversal and, when ls is smaller than lsc, Hn is the reversal field.

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Date submitted: 24 Nov 2008 Electronic form version 1.4