Abstract Submitted
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A Monte Carlo Approach to Modeling Thermal Decay in Perpendicular Recording Media[1] TIM FAL, JASON MERCER, MARTIN LEBLANC, JOHN WHITEHEAD, MARTIN PLUMER, Memorial University of Newfoundland, JOHANNES VAN EK, Western Digital Corporation — A procedure is developed to study the evolution of high anisotropy magnetic recording media due to thermally activated grain reversal [1]. Single-domain grains evolve by passing through a sequence of relatively long-lived metastable states punctuated by abrupt reversals. Solutions to the rate equations are obtained using a stochastic integration procedure that calculates the time between successive reversals. Transition rates are formulated from the Arrhenius-Neel expression in terms of the material parameters, the temperature and the applied field. The method is applied to study the rate dependence of finite temperature MH loops and the thermal degradation of a recorded bit pattern in perpendicular recording media. A significant advantage of the method is its ability to extend simulations over time intervals many orders of magnitude greater than is feasible using standard micromagnetics with relatively modest computational effort.
[1] T.J. Fal, J.I. Mercer, M.D. Leblanc, J.P. Whitehead, M.L. Plumer, and J. van Ek, Phys, Rev. B, submitted (2012).

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