

Abstract Submitted  
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**Measurement of Annihilation Barriers for Magnetic Vortices<sup>1</sup>** JACOB BURGESS, University of Alberta and National Institute for Nanotechnology, DAVID FORTIN, University of Alberta, JOE LOSBY, University of Alberta and National Institute for Nanotechnology, DENYS GROMBACHER, JOHN DAVIS, University of Alberta, MARK FREEMAN, University of Alberta and National Institute for Nanotechnology — Measurements of the susceptibility of an array of 2 micrometer diameter Permalloy discs are made using the AC magneto-optical Kerr effect. Employing an extended version of the rigid vortex model, saturation magnetization as a function of temperature is extracted from the data. The model also allows extraction of the switching distribution of the array as the discs transition from the vortex state to the quasi single-domain state. Tuning of temperature or sweep rate shows shifts in the distribution peak that confirm vortex annihilation is governed by a thermally activated mechanism. Using the measured saturation magnetization data in conjunction with the measured peak shifts, quantitative extraction of energetic parameters used in semi-empirical models of the annihilation energy barrier is possible. Several models are considered in the context of qualitative observations made in the experiment.

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