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Magneto-optical Kerr effect hysteresis measurements of pound-key-like magnetic nanostructures¹ LIN LI, MARTIN ASMAT, BRIAN SHAW, ARABINDA HALDAR, KRISTEN BUCHANAN, Department of Physics, Colorado State University — The magnetic antivortex (AV) state is a topological configuration that is expected to exhibit interesting physical behavior and it may also be useful for applications. Recent work showed that magnetic antivortices can be created in pound-key-like nanostructures via a two-step magnetic field procedure [1]. In this procedure, magnetic hysteresis measurements are important to predict the field values at which the AV's will form. The Magneto-Optical Kerr Effect (MOKE) is widely used to make magnetic hysteresis measurements, especially for magnetic nanostructures since measurements can be made on individual structures or small arrays. MOKE measurements were made on a series of micron-sized pound-key-like structures made of Permalloy to examine how the reversal process and critical fields depend on the details of the structure shape and size. Hysteresis loops were obtained with a high signal-noise ratio even though the amount of magnetic material and consequently the Kerr rotation angle were small (less than 0.02 mrad). Subsequent magnetic force microscopy imaging of the structures showed successful AV formation at the fields predicted from the MOKE measurements.

[1] Haldar and Buchanan, Appl. Phys. Lett. 102, 112401 (2013).

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