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Stabilization of Magnetic Antivortices and the role of Shape Anisotropy MARTIN ASMAT-UCEDA, LIN LI, BRIAN SHAW, ARABINDA HALDAR, KRISTEN BUCHANAN, Colorado State University — Magnetic vortices have attracted a great deal of interest in recent years due to their potential for applications such as data storage, microwave resonators, magnonic crystals, etc. Magnetic antivortices (AV) are expected to possess similarly interesting physical attributes; however, they have not been explored with the same intensity. The AV spin configuration may present some advantages over vortices, especially for channeling spin waves emitted from the dynamic core reversal and for de-coupling spin-transfer torque effects from parasitic Oersted fields. Currently only a few geometries have been identified that reliably promote the formation of an AV, thus limiting the study of their properties. We recently demonstrated a method to form AV's in pound-key-like structures made of Permalloy (Haldar et al. APL **102**, 112401, 2013). Here we investigate the dependence of the reliability of the AV formation on the details of the geometry of these structures. Magneto-optical Kerr effect (MOKE) hysteresis and magnetic force microscopy measurements show that the coercive field is also the nucleation field for the AV's. Micromagnetic simulations agree well with the experiments and highlight the role of shape anisotropy in the AV formation.

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