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Dynamics of Exchange-Biased Magnetic Vortices T. Y. CHEN, M. K. CHAN, P. A. CROWELL, University of Minnesota — We have studied magnetization dynamics in micron-sized circular disks composed of ferromagnetic (FM)-antiferromagnetic (AFM) bilayers. The patterned samples of FeMn/NiFe are field-cooled (FC) or zero-field cooled (ZFC) from above the blocking temperature to room temperature. Time-resolved Kerr microscopy measurements show that the vortex gyrotropic mode fluctuates in frequency as the vortex core is displaced by a static in-plane magnetic field. The average gyrotropic frequency and the magnitude of its fluctuations, which are due to pinning of the vortex core, are larger than in single layer FM films. The enhancement of the gyrotropic frequency is largest in the ZFC samples, in which the effective field due to exchange coupling is expected to enhance pinning of the vortex core at the center of the disk. We find, however, that micromagnetic simulations incorporating uniform or vortex-like exchange-bias fields do not explain our results quantitatively. We interpret this discrepancy as a consequence of randomly orientated AFM domains, which are comparable in size to the vortex core. This work was supported by NSF and the Univ. of Minnesota Graduate School.

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