Asymmetric Reversal in Exchange Bias: experiment and micromagnetic simulations

ZHI-PAN LI, Physics Department, UCSD, La Jolla, CA, USA, OLEG PETRACIC, IVAN K. SCHULLER, Physics Department, UCSD, La Jolla, CA, USA — Asymmetric reversal process in several exchange biased systems is a yet unexplained problem. Recent experimental results on epitaxial FeF$_2$/Ni bilayers reveal strongly asymmetrical hysteresis loops. A systematic micromagnetic study based on the assumption of pinned AF moments at the ferromagnetic interface is performed. The simulation result suggests a winding and unwinding of local incomplete domain walls in the ferromagnet parallel to the ferro-/antiferromagnet interface at only one side of the saturation is responsible for the asymmetry observed. The simulations are in very good agreement with the experiment results.

1Funding by US-DOE is acknowledged, and ZPL is benefited from Cal-(IT)2 fellowship.
2Angewandte Physik, U. Duisburg-Essen, Duisburg, Germany

Zhi-Pan Li
Physics Department, UCSD, La Jolla, CA, USA

Date submitted: 05 Dec 2004 Electronic form version 1.4