Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Evolution of exchange coupling in epitaxial Fe/SmCo during partial SmCo demagnetization* J. E. DAVIES, KAI LIU, UC - Davis, J. S. JIANG, S. D. BADER, Argonne National Laboratory, E. E. FULLERTON, Hitachi Global Storage Tech. — In epitaxial Fe/SmCo, irreversible magnetization reversal occurs once the SmCo hard layer starts switching [1,2]. We investigated the evolution of the interlayer exchange coupling as the hard SmCo layer demagnetizes using the first and second order reversal curve methods (FORC and SORC, respectively). The FORC distribution [2,3] shows two distinct features during the hard layer reversal: a single positive peak at high fields and a negative/positive pair of features at low applied fields. The single peak corresponds to the reversal of the hard SmCo layer and yields a SmCo switching field distribution. The negative/positive pair is due to reversal of the soft Fe layer and its position traces the evolving interlayer exchange coupling strength. SORC measurements show that the Fe layer remains mostly reversible during SmCo demagnetization and allow direct determination of the exchange field. The measured exchange field evolution agrees with an analytical model [4]. [1].Fullerton, et al., PRB 58, 12193 (1998). [2].Davies, et al, APL 86, 262503 (2005). [3].Davies, et al, PRB 70, 224434 (2004); PRB 72, 134419 (2005). [4].Vlasko-Vlasov et al. PRL 86, 4386 (2001). * Supported by ACS-PRF, Alfred P. Sloan Foundation and DOE (BES-MS contract #DE-AC02-06CH11357)

Joseph Davies
UC - Davis

Date submitted: 20 Nov 2006 Electronic form version 1.4