Abstract Submitted
for the TSF11 Meeting of
The American Physical Society

Effect of Cu Layer on FeMn Magnetic Properties DOGAN KAYA, Texas A&M University, PRIYANGA JAYATHILAKA, CASEY W. MILLER, University of South Florida, IGOR V. ROSHCHIN, Texas A&M University — Growing demand for high-density memories requires new materials for magnetoresistive sensors in the read heads. FeMn has a great potential to be used for exchange-biasing the reference layer in the read heads. One of the crucial puzzles is the origin of the uncompensated magnetization in the antiferromagnetic FeMn. To study that, we use Cu layer to affect the magnetic properties of FeMn and its uncompensated magnetization. The multilayers of Ta(50 Å)/[FeMn(50 Å – 150 Å)/Cu(50 Å)]$_{10}$/Ta(50 Å) are deposited by UHV DC magnetron sputtering on top of Si/SiO$_x$ 3 mm x5 mm substrates. Samples with a single layer of FeMn of the same thickness, Ta(50 Å)/FeMn(50 Å – 150 Å)/Ta(50 Å) are used as control samples. The samples are cooled in a field of 7 T and their magnetization is measured using a SQUID magnetometer. All the samples have uncompensated magnetization that exhibits a hysteresis at 10 K. It is found that for the FeMn/Cu multilayers, the hysteresis loops are exchange bias shifted, while FeMn without Cu exhibits no exchange bias. Dependence of coercive field (H$_c$), exchange bias (H$_e$), and saturated magnetization (M$_s$) on the FeMn thickness and on temperature will be discussed. Work is supported by Texas A&M University, TAMU-CONACYT Collaborative Research Program, and by NSF-CAREER.

Dogan Kaya

Date submitted: 09 Sep 2011 Electronic form version 1.4