Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Spin-flipping with the antiferromagnets (AF) FeMn and IrMn RAKHI ACHARYYA, HOANG YEN THI NGUYEN, WILLIAM P. PRATT JR., JACK BASS, Physics Dept., Michigan State University, East Lansing, MI — We investigate spin-flipping within the antiferromagnets AF = FeMn and IrMn and at their interfaces with Cu. To do so, we measure the Current-Perpendicular-to-Plane (CPP) magnetoresistance (MR) of sputtered Permalloy (Py = Ni(1-x)Fe(x) with x $\sim$ 0.2) based exchange-biased spin-valves (EBSVs) with an AF layer insert of variable thickness in the middle of the central 20 nm thick Cu layer. New measurements with thin inserts of IrMn are consistent with prior ones for thin FeMn inserts [1]—i.e., as little as 1 nm of IrMn placed in the middle of the EBSV causes the MR to drop by a factor of 50. Such a rapid drop corresponds to an effective spin-diffusion-length of only about 1 monolayer (ML), less than the $\sim$ 3 ML intermixing we expect at the AF/Cu interface. As in ref. [1], we attribute this rapid drop to strong spin-flipping at the AF/Cu interface. We also report new measurements extending both IrMn and FeMn thicknesses beyond 2 nm. In each case, the rate of decrease of MR becomes much slower, apparently corresponding to much longer spin-diffusion lengths within the bulk AFs. The work was supported in part by NSF grant DMR 08-04126.

[1] W. Park et al., Phys. Rev. **B62**, 1178 (2000)

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Date submitted: 18 Nov 2009 Electronic form version 1.4