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Current-Induced Magnetoresistance in Antiferromagnetic Spin Valves[1] Z. WEI, University of Texas at Austin, A. SHARMA, J. BASS, Michigan State University, M. TSOI, University of Texas at Austin — Influence of the magnetic state of a ferromagnet (F) on its electronic transport properties has been found in various phenomena, including giant magnetoresistance (GMR) in magnetic multilayers, where the relative orientation of the magnetic moments of F-layers affects the current flow. MacDonald and co-workers recently predicted that a corresponding effect - antiferromagnetic GMR (AGMR) - should exist in structures where F-layers are replaced by antiferromagnets (AFM). To test this prediction, we measured the (closely) current-perpendicular to plane (CPP) magnetoresistance (MR) of three types of AFM spin-valve multilayers: (I) AFM/N/AFM, (II) F/AFM/N/AFM, and (III) F/AFM/N/AFM/F, with a non-magnetic (N) layer between the two AFM layers. We saw no MR in samples of type I or II at any current density j, or of type III when j was small. But large enough j $\sim 10^{13}$ A/m^2 applied to type III multilayers gave small positive MRs (largest resistance at high field). As these MRs are inverted from the usual GMR associated with the F-layers, they must be due to the AFM layers, and thus be an AGMR. We will describe how this AGMR varied with applied current j and AFM layer thickness [arXiv:0711.0059].

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