

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Non-collinear giant magnetoresistance in (Ga,Mn)As/p-GaAs/(Ga,Mn)As trilayers GANG XIANG, MENG ZHU, BEN LI SHEU, PETER SCHIFFER, NITIN SAMARTH, Physics Dept., Penn State University, University Park PA 16802 — Giant magnetoresistance (GMR) due to spin-dependent scattering has been extensively studied in ferromagnetic metal multilayers. However, the effect has eluded observation in ferromagnetic semiconductor multilayers where other sources of magnetoresistance (MR) are usually dominant. Here, we report the possible observation of GMR in (Ga,Mn)As/p-GaAs/(Ga,Mn)As trilayers. Samples are designed such that the (Ga,Mn)As layers have distinct coercive fields and the p-GaAs spacer layer has a conductivity comparable to the (Ga,Mn)As layers. We measure longitudinal and transverse MR using Hall bars oriented along different crystalline directions and observe signatures consistent with GMR when the relative magnetization orientation in the two (Ga,Mn)As layers switches between collinear and non-collinear arrangements. Our measurements show that these signatures are distinct from other known sources of MR and further suggest that the observed GMR is associated with spin-dependent scattering at interfaces. Supported by DARPA, ONR and NSF.

Nitin Samarth
Penn State University

Date submitted: 29 Nov 2005

Electronic form version 1.4