Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Magnetoresistance Anomalies Across Domain Walls in Tensile Strained (Ga,Mn)As G. XIANG, A.W. HOLLEITNER, B.L. SHEU, F.M. MENDOZA, O. MAKSIMOV, P. SCHIFFER, D.D. AWSCHALOM, N. SAMARTH, Materials Research Institute, Penn State University and Center for Spintronics and Quantum Computation, University of California-Santa Barbara — We describe measurements of the anomalous Hall effect (AHE), planar Hall effect and anisotropic magnetoresistance (AMR) in tensile-strained (Ga,Mn)As epilayers with relatively high Curie temperatures (125K $<$ T_C $<$ 135K). Samples are grown on a strain-relaxed (Ga,In)As buffer layer deposited on (001) GaAs, creating an in-plane tensile strain that orients the easy axis of the magnetization along [001]. We measure magnetoresistance as a function of the magnetic field vector $\vec{H}$ and temperature (4.2K $<$ T $<$ 150K) using Hall bars oriented along [110],[1$\bar{1}$0] and [100]. AMR measurements reveal striking antisymmetric resistance anomalies as we sweep either the magnitude or angle of $\vec{H}$. These anomalies originate in a strong AHE contribution to the AMR when measurements are made across domain walls in the presence of slight sample misorientation, providing a sensitive probe of the nucleation and propagation of magnetic domain walls up to temperatures as high 120K. Work supported by DARPA, ONR and NSF.

Nitin Samarth
Materials Research Institute, Penn State University
and Center for Spintronics and Quantum Computation, University of California-Santa Barbara

Date submitted: 04 Dec 2004 Electronic form version 1.4