

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Spin Torque Switching in GaMnAs Magnetic Tunnel Junctions¹

LIN XUE, R. A. BUHRMAN, D.C. RALPH, Cornell University, D.W. RENCH, M.J. WILSON, P. SCHIFFER, N. SAMARTH, Physics Dept., Penn State University — We have fabricated and measured submicron magnetic tunnel junctions made from GaMnAs multilayers: GaMnAs/GaAs/GaMnAs/MnAs, where GaMnAs is a ferromagnetic semiconductor, GaAs serves as the tunneling barrier, and MnAs is a ferromagnet that provides an exchange bias to the upper GaMnAs (reference) layer. The devices have magnetoresistances of order 50% at 4.2 K and exhibit clear spin-torque switching of the lower GaMnAs layer between parallel and antiparallel orientations relative to the reference layer. We report the switching phase diagram as a function of current and magnetic field. We also describe efforts to probe the high-speed magnetic dynamics in GaMnAs driven by spin torque from ns-scale current pulses and microwave-frequency currents that can drive ferromagnetic resonance.

¹This work is supported by ONR MURI.

Lin Xue
Cornell University

Date submitted: 30 Dec 2010

Electronic form version 1.4