Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Spin Polarized Electron Transport near the Si/SiO2 Interface[1] H.-JAE JANG, Dept. of Physics and CNAM, Univ of Maryland, Collge Park, Now at NIST, Gaithersburg, GARDNER SWAN, IAN APPELBAUM, Dept. of Physics and CNAM, Univ of Maryland, College Park — Using long-distance lateral devices, spin transport near the interface of Si and its native oxide (SiO2) is studied by spin-valve measurements in an in-plane magnetic field and spin precession measurements in a perpendicular magnetic field at 60K.[1] As electrons are attracted to the interface by an electrostatic gate, we observe shorter average spin transit times and an increase in spin coherence, despite a reduction in total spin polarization. This behavior, which is in contrast to the expected exponential depolarization seen in bulk transport devices, is explained using a transform method to recover the empirical spin current transit-time distribution and a simple two-stage drift-diffusion model. [2,3] We identify strong interface-induced spin depolarization (reducing the spin lifetime by over two orders of magnitude from its bulk transport value) as the consistent cause of these phenomena. In addition, we will discuss the novel spin transport phenomena near Si/SiO2 interface in high magnetic field regime. References [1] H.-J. Jang and I. Appelbaum, Phys. Rev. Lett. 103, 117202 (2009) [2] J. Li and I. Appelbaum, Appl. Phys. Lett. 95, 152501 (2009) [3] I. Appelbaum, arxiv:condmat/0910.2606 (2009)

[1]This work was funded by DARPA/MTO, the ONR, and the NSF.

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Date submitted: 16 Nov 2009 Electronic form version 1.4