Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Pauli Spin Blockade and Lifetime-Enhanced Transport in a Si/SiGe double quantum dot[1] TECK SENG KOH, C.B. SIMMONS, NAKUL SHAJI, MADHU THALAKULAM, L.J. KLEIN, HUA QIN, H. LUO, D.E. SAVAGE, M.G. LAGALLY, University of Wisconsin-Madison, A.J. RIMBERG, Dartmouth College, ROBERT JOYNT, ROBERT BLICK, MARK FRIESEN, S.N. COPPERSMITH, M.A. ERIKSSON, University of Wisconsin-Madison — We analyze electron transport data through a Si/SiGe double quantum dot in terms of spin blockade and lifetime-enhanced transport (LET), which is transport through excited states that is enabled by long spin relaxation times. We present a series of low-bias voltage measurements showing the sudden appearance of a strong tail of current that we argue is an unambiguous signature of LET appearing when the bias voltage becomes greater than the singlet-triplet splitting for the (2,0) electron state. We present eight independent data sets, in both forward and reverse bias regimes, and show that excellent fits to all data sets were obtained using one consistent set of parameters. We also obtain quantitative estimates for the tunneling rates and currents in the reverse bias regime using the Lindblad formalism. [Ref: arXiv:1008.5398v1]

[1]This work was supported in part by ARO and LPS (W911NF-08-1-0482), by NSF (DMR-08325634, DMR- 0805045), and by DOE (DE-FG02-03ER46028).

Teck Seng Koh
University of Wisconsin-Madison

Date submitted: 22 Dec 2010 Electronic form version 1.4