Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Quantum point contacts on two-dimensional electron gases with a strong spin-orbit coupling[1] JOON SUE LEE, California NanoSystems Institute, Univ of California, Santa Barbara, MIHIR PENDAHARKAR, Department of Electrical and Computer Engineering, Univ of California, Santa Barbara, BORZOYEH SHOJAEI, Materials Department, Univ of California, Santa Barbara, ANTHONY P. MCFADDEN, Department of Electrical and Computer Engineering, Univ of California, Santa Barbara, CHRIS PALMSTRM, Materials Department and Department of Electrical and Computer Engineering, Univ of California, Santa Barbara — Studies of electrical transport in one-dimensional semiconductors in a presence of a strong spin-orbit interaction are crucial not only for exploring the emergent phenomena, such as topological superconductivity, but also for potential spintronic applications by controlling of the electron spins. We investigate the electrical transport properties of one-dimensional confinement defined by electrostatic potentials on large area two-dimensional electron gases of InAs and InSb, which have a strong spin-orbit coupling. The high-quality InAs and InSb quantum wells are grown on antimonide buffers by molecular beam epitaxy, and the gate-tunable regions are created using Al_2O_3 or HfO_2 gate dielectrics by atomic layer deposition. We will discuss the modulation of spin-orbit coupling in the two-dimensional electron gases and the spin-orbit-induced spin splitting by the split-gate quantum point contacts.

[1]This work was supported by Microsoft Research.

Joon Sue Lee
California NanoSystems Institute, Univ of California, Santa Barbara

Date submitted: 06 Nov 2015 Electronic form version 1.4