Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Few Electron Si/SiGe Quantum Dots LEVENTE KLEIN, University of Wisconsin, SRIJIT GOSWAMI, DON SAVAGE, KEITH SLINKER, LISA MCGUIRE, MAX LAGALLY, MARK ERIKSSON — Fully top-gated silicon/silicon-germanium quantum dots have been fabricated and characterized at low temperatures. For the quantum dots with few electron occupation, by varying the gate voltages two regimes may be accessed: at large negative voltages sharp Coulomb diamonds and classical Coulomb blockade is observed with a charging energy of 3.8 meV. At more positive gate voltage, co-tunneling features appear and a zero-bias conductance anomaly is observed with a behavior closely resembling the quantum dot Kondo effect. The increased zero-bias conductance vanishes with increasing temperature, and this peak splits into two peaks at finite drain-source voltage with increasing perpendicular magnetic field. The peak splitting increases linearly with increasing magnetic field. We discuss the various conductance regimes and the application of these types of quantum dots for quantum information processing.

Levente Klein
University of Wisconsin Madison

Date submitted: 30 Nov 2005 Electronic form version 1.4