Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Correlation of Conductance Measurements from a Quantum Dot with Three Terminals RYAN TOONEN, Department of Electrical and Computer Engineering, University of Wisconsin at Madison, MARTA PRADA, School of Electronic and Electrical Engineering, University of Leeds, HUA QIN, Department of Electrical and Computer Engineering, University of Wisconsin at Madison, ANDREAS HUETTEL, Sektion Physik, Ludwig-Maximilians-Universitaet, SRIJIT GOSWAMI, MARK ERIKSSON, Department of Physics, University of Wisconsin at Madison, ROBERT BLICK, DANIEL VAN DER WEIDE, Department of Electrical and Computer Engineering, University of Wisconsin at Madison, KARL EBERL, Max-Planck-Institut fuer Festkoerperforschung Stuttgart — We have measured the differential conductance of a quantum dot coupled by three tunable tunneling barriers to three terminals. The quantum dot is formed by laterally constricting a two-dimensional electron gas (2DEG) in an $Al_xGa_{1-x}As$/GaAs heterostructure with Schottky split-gates. The advantage to performing conductance measurements on a quantum dot with three leads is that we are able to directly measure information about the individual tunneling barriers and determine how the states interact with the leads. At a base temperature of 250mK, we have observed new phenomena not previously reported from three-terminal, mesoscopic experiments. These effects include conductance peak suppression in the nonlinear bias regime and the simultaneous coupling of two different states to two separate leads.

Ryan Toonen
Department of Electrical and Computer Engineering
University of Wisconsin at Madison

Date submitted: 07 Dec 2004 Electronic form version 1.4