Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Measuring the Charge Parity of an InAs Double Quantum Dot[1]
M.D. SCHROER, M. JUNG, K.D. PETERSSON, J.R. PETTA, Princeton University — We have fabricated tunable, few electron InAs nanowire double quantum dots (DQDs) which support rapid electrically driven single spin rotations.[2] However, the measurement of nanowire DQDs presents an outstanding problem, typically relying on transport through the sample due to the lack of a local quantum point contact charge detector. We demonstrate a non-invasive charge sensing method based on a radio frequency measurement of the sample's complex admittance, which yields a fast and sensitive determination of the charge state.[3] We show that this measurement is also sensitive to the spin state of the DQD, allowing a simple determination of the total charge parity in the sample.[4] Radio frequency charge parity measurement may prove useful in high effective mass systems, such as Si/SiGe quantum dots, where the determination of the absolute charge number is not always feasible.

[1]Supported by the Sloan and Packard Foundations, ARO, DARPA, and the NSF.
[2]M. D. Schroer, K. D. Petersson, M. Jung and J. R. Petta, Phys. Rev. Lett. **107**, 176811 (2011).
[3]M. Jung, M. D. Schroer, K. D. Petersson and J. R. Petta, Appl. Phys. Lett. **100**, 253508 (2012).
[4]M. D. Schroer, M. Jung, K. D. Petersson and J. R. Petta, Phys. Rev. Lett. **109**, 166804 (2012).

Michael Schroer
Princeton University

Date submitted: 08 Nov 2012 Electronic form version 1.4