Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Observation of conductance doubling in an Andreev quantum point contact[1] M KJAERGAARD, F NICHELE, H SUOMINEN, Center for Quantum Devices Station Q Copenhagen, M NOWAK, M WIMMER, A AKHMEROV, Kavli Institute for Nanoscience, TU Delft, J FOLK, Department of Physics and Astronomy, Unversity of British Columbia, K FLENSBERG, Center for Quantum Devices Station Q Copenhagen, J SHABANI, Physics Department, City College of New York, C PALMSTROM, California NanoSystems Institute, University of California Santa Barbara, C MARCUS, Center for Quantum Devices Station Q Copenhagen — One route to study the non-Abelian nature of excitations in topological superconductors is to realise gateable two dimensional (2D) semiconducting systems, with spin-orbit coupling in proximity to an s-wave superconductor. Previous work on coupling 2D electron gases (2DEG) with superconductors has been hindered by a non-ideal interface and unstable gateability. We report measurements on a gateable 2DEG coupled to superconductors through a pristine interface, and use aluminum grown in situ epitaxially on an InGaAs/InAs electron gas. We demonstrate quantization in units of $4e^2/h$ in a quantum point contact (QPC) in such hybrid systems. Operating the QPC as a tunnel probe, we observe a hard superconducting gap, overcoming the soft-gap problem in 2D superconductor/semiconductor systems. Our work paves way for a new and highly scalable system in which to pursue topological quantum information processing.

[1]Research supported by Microsoft Project Q and the Danish National Research Foundation

Morten Kjaergaard
Center for Quantum Devices
Station Q Copenhagen

Date submitted: 05 Nov 2015 Electronic form version 1.4