

Abstract Submitted  
for the MAR15 Meeting of  
The American Physical Society

**Bound States in “Majorana Box”<sup>1</sup>** SVEN ALBRECHT, University of Copenhagen, ANDREW HIGGINBOTHAM, University of Copenhagen, Harvard University, FERDINAND KUEMMETH, PETER KROGSTRUP, THOMAS JESPERSEN, JESPER NYGÅRD, CHARLES MARCUS, University of Copenhagen — We perform bias spectroscopy and observe Coulomb peak motion in InAs quantum dots with an epitaxial superconducting aluminum shell. Varying the length of the aluminum shell and applying a magnetic field, we are able to tune between regimes with 2e and 1e-periodic Coulomb oscillations. The doubling in periodicity reflects a transition from two-electron tunneling to single quasiparticle charging, attributable to a competition between the charging energy and the superconducting energy gap. At high fields below the superconducting-to-normal transition, we observe low-lying features in bias and 1e-periodic Coulomb peaks, both consistent with the presence of a zero-energy discrete state. We discuss these results in the context of proposed experimental signatures of Majorana fermions.

<sup>1</sup>Research supported by Microsoft Station Q, Danish National Research Foundation, Villum Foundation, Lundbeck Foundation, and the European Commission.

Sven Albrecht  
University of Copenhagen

Date submitted: 14 Nov 2014

Electronic form version 1.4