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Zero Modes in Single and Double Majorana Islands¹

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This talk presents recent experiments on InAs nanowires with epitaxial superconducting Al that are electrostatically gated to produce single and double nanowire segments with controllable density and tunnel barriers. These hybrid semiconductor-superconductor devices support Andreev bound states, which coalesce into Majorana zero modes in an applied axial magnetic field. Here, we focus on the regime of Coulomb blockade, where the combined effects of charging energy and zero modes yield distinct and characteristic signatures in transport. Length and coupling-strength dependence of single islands, and interdot coupling dependence of double islands will be presented and compared to recent theory. Prospects for coherent control (qubit initialization, manipulation, and readout) based on these and related devices hybrid Coulomb-blockade structures will also be discussed.

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