Scalable Designs for Topological Quantum Computation with Majorana Zero Modes: Part 1, Overview TORSTEN KARZIG, Station Q, Microsoft Research, CHRISTINA KNAPP, Univ of California - Santa Barbara, ROMAN LUTCHYN, PARSA BONDERSON, MATTHEW HASTINGS, Station Q, Microsoft Research, CHETAN NAYAK, Univ of California - Santa Barbara; Station Q, Microsoft Research, JASON ALICEA, CalTech, KARSTEN FLENSBERG, Niels Bohr Institute, STEPHAN PLUGGE, Niels Bohr Institute; University Dsseldorf, YUVAL OREG, Weizmann Institute of Science, CHARLES MARCUS, Niels Bohr Institute, MICHAEL FREEDMAN, Station Q, Microsoft Research; Univ of California- Santa Barbara — We present scalable designs for topological quantum computation using Majorana zero modes (MZMs). The topological qubits are encoded in aggregates of four or six MZMs assembled into superconducting islands with significant charging energy to protect against quasi particle poisoning. In such a scheme, quantum information can be manipulated according to a measurement-only protocol. In this talk, we will give an overview of different designs and the corresponding measurement-based protocols.

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