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Novel Josephson circuit elements for high magnetic field parity detection

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Evidence for Majorana modes in semiconductor nanowires to date has relied on DC transport measurements that probe their zero-energy characteristics. However, in order to unambiguously demonstrate the non-Abelian nature of Majoranas, it is necessary to braid them and measure their parity. Superconducting transmon qubits have been shown to be sensitive parity detectors, however traditional designs are incompatible with the strong magnetic fields required for the creation of Majoranas in nanowires. In this talk I will discuss our development of novel superconducting circuit elements such as CPW resonators, tunnel junctions, transmon qubits and on chjp microwave sources that survive magnetic fields in excess of 1T.