

Persistent current and zero-energy Majorana modes in a p-wave disordered superconducting ring.

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We discuss the emergence of zero-energy Majorana modes in a disordered finite-length p-wave one-dimensional superconducting ring, pierced by a magnetic flux Φ tuned at an appropriate value $\Phi = \Phi^*$. In the absence of fermion parity conservation, we evidence the emergence of the Majorana modes by looking at the discontinuities in the persistent current $I[\Phi]$ at $\Phi = \Phi^*$. By monitoring the discontinuities in $I[\Phi]$, we map out the region in parameter space characterized by the emergence of Majorana modes in the disordered ring.