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Topological multiterminal superconducting systems

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Multiterminal Josephson junctions (MJJs) constitute engineered topological systems. In [1] we studied the properties of Andreev states in a circuit with a quantum dot (QD) coupled to superconducting leads (SCs) and demonstrated that the quantum geometric tensor can be extracted by synthetically polarized microwaves. In [2] we investigated a linear chain of QDs connected to SCs and showed that nontrivial topology appears beyond a threshold value of the nonlocal proximity-induced pairing potential. Finally we demonstrated such systems can implement higher-dimensional topological systems (second Chern number) and admit non-Abelian Berry phase [3].

[1] R. Klees et al., PRL 124, 197002 (2020).

[2] R. L. Klees et al., PRB 103, 014516 (2021).

[3] H. Weisbrich et al., PRX Quantum 2, 010310 (2021).

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