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Topological properties of linear circuit lattices VICTOR V. ALBERT, LEONID I. GLAZMAN, LIANG JIANG, Yale University — Motivated by the topologically insulating (TI) circuit of capacitors and inductors proposed and tested in [1], we present a related circuit with less elements per site [2]. The normal mode frequency matrix of our circuit is unitarily equivalent to the tight-binding matrix of a quantum spin Hall insulator. Spinful fermionic time-reversal symmetry manifests itself in the TI circuit context as a result of a discrete symmetry of the circuit; elastic backscattering between edge normal modes does not occur whenever a circuit perturbation is invariant under such a symmetry. We also generalize the idea and provide a platform to simulate tunable and locally accessible lattices with arbitrary spin-orbit hopping. A simulation of a non-Abelian Aharonov-Bohm effect using such linear circuit designs is discussed.

[1] N. Jia, A. Sommer, D. Schuster, and J. Simon, e-print arXiv:1309.0878.
[2] V. V. Albert, L. I. Glazman, and L. Jiang, e-print arXiv:1410.1243.

Liang Jiang
Yale University

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