Experimental characterization of the dynamics of helical topological states.

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Abstract

We experimentally investigate the existence of helical edge-states generated in systems with a nontrivial topological behavior and characterized by the Z2 invariant. Using a microwave experimental setup able to mimic the behavior of a tight-binding system, we analyze a set of honeycomb-like structures built using a triangular lattice with a hexagonal unit cell, which mimic a nontrivial topological quantum system with spin. By recovering the modal structure in real space and the density of states, our results reveal the possibility to open a topological gap, dwelt by edge states that live in the border of the structure. Finally, we demonstrate the unidirectional counterpropagative features of such helical edge states and characterized their dynamics.

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