

## Topological heat transport and symmetry-protected boson currents

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The study of non-equilibrium properties in topological systems is of practical and fundamental importance. Here, we analyze the stationary properties of a two-dimensional boson topological insulator coupled to two thermal baths in the quantum open-system formalism. Novel phenomena appear like chiral edge heat currents that are the out-of-equilibrium counterparts of the zero-temperature edge currents. We find the new set of discrete symmetries that protect these topological heat currents, differing from the zero-temperature limit. Remarkably, one of these currents flows opposite to the decreasing external temperature gradient. As the starting point, we consider the case of a single external reservoir showing prominent results like thermal erasure effects and topological thermal currents. Our results are experimentally accessible with platforms like photonics systems and optical lattices.