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Topological quantum dissipative phases with trapped ions

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We simulate topological dissipative phases in a one-dimensional chain of trapped ions with their vibrational degrees of freedom. First, we study non-reciprocity in a two-ion parametric dimer and then we analyze topological amplification in large chains where Coulomb long-range couplings become apparent.
The existence of topologically non-trivial phases leads to the presence of edge states that produce amplification being robust against disorder. The control of the parametric driving terms is achieved by taking advantage of state-of-the-art Floquet engineering techniques. We characterize the stability of the system and find stable topological amplifiers and two-mode Gaussian steady-states that can produce entanglement.

Abstract category

Quantum Simulations

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