

Superconducting Circuits for Quantum Simulation of Dynamical Gauge Fields

Wed, 2014-01-22 14:01 - [Christian Roos](#) [1] **Date:** 2013-09-13 - 2014-01-22

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Reference:

Phys. Rev. Lett. 111, 110504 (2013)

URL:

<http://prl.aps.org/abstract/PRL/v111/i11/e110504> [2]

We describe a superconducting-circuit lattice design for the implementation and simulation of dynamical lattice gauge theories. We illustrate our proposal by analyzing a one-dimensional U(1) quantum-link model, where superconducting qubits play the role of matter fields on the lattice sites and the gauge fields are represented by two coupled microwave resonators on each link between neighboring sites. A detailed analysis of a minimal experimental protocol for probing the physics related to string breaking effects shows that, despite the presence of decoherence in these systems, distinctive phenomena from condensed-matter and high-energy physics can be visualized with state-of-the-art technology in small superconducting-circuit arrays.

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