

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Observing the nonequilibrium dynamics of the quantum transverse-field Ising chain in circuit QED OLIVER VIEHMANN, JAN VON DELFT, Physics Department, ASC, and CeNS, LMU Munich, FLORIAN MARQUARDT, Institute for Theoretical Physics, FAU Erlangen-Nuremberg — Circuit QED architectures of superconducting artificial atoms and microwave resonators are currently moving towards multi-atom, multi-resonator setups with drastically enhanced coherence times, making them increasingly attractive candidates for quantum simulations of interesting interacting quantum many-body systems. Here we propose and analyze a circuit QED design that implements the quantum transverse-field Ising chain coupled to a microwave resonator for readout. Our setup can be used to study quench dynamics, the propagation of localized excitations, and other nonequilibrium features, in a field theory exhibiting a quantum phase transition, and based on a design that is feasible with current technology and could easily be extended to break the integrability of the system.

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Date submitted: 04 Nov 2012

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