

Abstract Submitted  
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**Quantum Simulation with Arrays of Transmon Qubits**<sup>1</sup> SHAY HACHOHEN-GOURGY, VINAY RAMASESH, QNL, University of California, Berkeley, OLIVER VIEHMANN, JAN VON DELFT, Physics Dept, Arnold Sommerfeld Center for Theoretical Physics, and Center for NanoScience, Ludwig-Maximilians-Universität, Theresienstraße 37, FLORIAN MARQUARDT, Institut for Theoretical Physics, Universität Erlangen-Nürnberg, Staudtstraße 7, D-91058 Erlangen, Germany, IRFAN SIDDIQI, QNL, University of California, Berkeley — We present progress toward quantum simulation of one-dimensional spin chains using planar transmon qubits in a circuit QED architecture. In particular, we discuss the Ising model as realized by an array of capacitively-coupled transmon qubits with the terminal qubit dispersively coupled to a microwave resonator. We engineer an approximation to the Ising Hamiltonian with the ground and excited states playing the role of spin-up and spin-down atoms. We present preliminary spectroscopic data and coherent manipulations in chains of varying length.

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