Abstract Submitted
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Engineering and control of coupled superconducting qubits arrays for quantum simulation[1] E. HENRY, A. SCHMIDT, QNL, UC Berkeley, O. VIEHMANN, Ludwig-Maximilians-Universität, I. SIDDIQI, QNL, UC Berkeley — Superconducting qubit technology allows for engineering experimentally accessible, macroscopic quantum systems to arbitrary specifications within a large parameter space. By coupling multiple superconducting qubits in a periodic array, it is possible to fabricate physical objects which mimic the properties of naturally occurring systems not readily accessible to measurement or parameter variation, or theoretical systems not occurring in nature. We discuss design, fabrication, and measurement of a physical realization of the quantum Ising model in zero and one dimension. This is accomplished using a chain of identical transmon qubits acting as artificial spins whose interaction is dominated by nearest neighbor coupling. Control and readout of the system is accomplished by coupling only one of the artificial spins to a microwave resonator in a circuit QED architecture.

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