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Design and characterization of a multi-qubit circuit for quantum simulations¹ VINAY RAMASESH, KEVIN O'BRIEN, ALLISON DOVE, JOHN MARK KREIKEBAUM, JAMES COLLESS, IRFAN SIDDIQI, Quantum Nanoelectronics Laboratory, Department of Physics, University of California, Berkeley CA 94720, USA, QUANTUM NANOELECTRONICS LABORATORY TEAM — Superconducting qubits, due to remarkable progress in coherence times, have recently realized a variety of quantum simulation experiments. These simulations, which promise to shed light on open questions in fields ranging from quantum chemistry to quantum chromodynamics, have largely been performed with either a single qubit or a few coupled qubits. Implementing more sophisticated simulations requires scaling up the number of qubits on a single chip. Additionally, the recent development of a broadband near-quantum-limited amplifier offers the possibility to simultaneously read out the state of multiple qubits on a single device. We present initial progress on the design, fabrication, and characterization of such a multi-qubit cQED circuit, with a focus towards near-term quantum simulation applications. This work was supported by the Army Research Office

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