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Engineering scalable fault-tolerant quantum computation MOLLIE KIMCHI-SCHWARTZ, ROSENBERG DANNA, DAVID KIM, JONILYN YODER, MIT Lincoln Laboratory, Lexington, MA 02420, MORTEN KJAERGAARD, Research Laboratory of Electronics, MIT, Cambridge,MA 02139, RABINDRA DAS, MIT Lincoln Laboratory, Lexington, MA 02420, JEFF GROVER, SIMON GUSTAVSSON, Research Laboratory of Electronics, MIT, Cambridge,MA 02139, WILLIAM OLIVER, MIT Lincoln Laboratory, Lexington, MA 02420; Research Laboratory of Electronics, MIT, Cambridge, MA 02139 — Recent demonstrations of quantum protocols comprising on the order of 5-10 superconducting qubits are foundational to the future development of quantum information processors. A next critical step in the development of resilient quantum processors will be the integration of coherent quantum circuits with a hardware platform that is amenable to extending the system size to hundreds of qubits and beyond. In this talk, we will discuss progress toward integrating coherent superconducting qubits with signal routing via the third dimension. This research was funded in part by the Office of the Director of National Intelligence (ODNI), Intelligence Advanced Research Projects Activity (IARPA) and by the Assistant Secretary of Defense for Research Engineering under Air Force Contract No. FA8721-05-C-0002. The views and conclusions contained herein are those of the authors and should not be interpreted as necessarily representing the official policies or endorsements, either expressed or implied, of ODNI, IARPA, or the US Government.

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