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Airbridges for scalable microwave control of superconducting qubits MICHAEL T. FANG, ANDREW J. KELLER, OSKAR J. PAINTER, California Institute of Technology — Multi-qubit Xmon devices with high fidelity control and readout show a promising architecture for quantum information processing. However, complexity in circuit design and layout prevents simple routing of microwave lines as the interconnectivity of qubits increases. This complexity is due to suppressing parasitics such as microwave crosstalk and slotline modes. We propose and demonstrate a technique for fabricating robust superconducting aluminum airbridges using electron beam lithography to suppress slotline modes. We extend the practical use of airbridges with "hop-overs". Hop-overs allow microwave lines to cross paths with reduced crosstalk while enabling readout and control of many qubits as an alternative for flip chip or through-chip via techniques.

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