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2D cavity grid quantum computing JAN VON DELFT, FERDINAND HELMER, Department of Physics, Arnold Sommerfeld Center for Theoretical Physics, and Center for NanoScience, Ludwig-Maximilians University Munich, Germany, MATTEO MARIANTONI, Walther Meissner Institute, Bavarian Academy of Sciences, Garching, Germany, FLORIAN MARQUARDT, ENRIQUE SOLANO, Department of Physics, Arnold Sommerfeld Center for Theoretical Physics, and Center for NanoScience, Ludwig-Maximilians University Munich, Germany — We propose a novel scheme for scalable solid state quantum computing, where superconducting microwave transmission line resonators (cavities) are arranged in a two-dimensional grid on the surface of a chip, coupling to superconducting qubits (charge or flux) at the intersections. We analyze how tasks of quantum information processing can be implemented in such a topology, including efficient two-qubit gates between any two qubits, initialization and read-out. The effects of decoherence, fabrication imperfections and inhomogeneities will be addressed.

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