Abstract Submitted
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Design and processing considerations for superconducting qubits coupled to multiple 3D cavities[1] DANIELA F. BOGORIN, B.L.T. PLOURDE, Syracuse University, Physics Department, Syracuse, NY 13244 USA, DOUGLAS MCCLURE, MARTIN SANDBERG, HANHEE PAIK, BALEEGH ABDO, IBM T.J. Watson Research Center, Yorktown Heights, New York, 10598, USA — Arrays of three-dimensional waveguide microwave cavities with superconducting transmon qubits bridging between adjacent cavities form a promising architecture for implementing quantum information processing. The performance of these transmon bridge qubits can be limited by multiple factors including losses on the substrate surface and in the metal traces, as well as surfaces losses in the cavities and couplings to spurious modes in the cavity structures. To address these issues, we are investigating a variety of cavity designs, materials, and surface coatings. We are also exploring different geometries for the qubit electrodes as well as different materials for the substrates and qubit capacitor metallization and various device-processing techniques. We will present low-temperature measurements of some of the resulting qubits.

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