Abstract Submitted for the MAR14 Meeting of The American Physical Society

Thermalization of transmon qubits in 3D multi-cavity structures<sup>1</sup> DANIELA F. BOGORIN, Syracuse University, Physics Department, DOUG MC-CLURE, IBM T.J. Watson Research Center, MATTHEW WARE, STEPHEN SOROKANICH, B.L.T. PLOURDE, Syracuse University, Physics Department — One avenue for dramatically improving coherence times of superconducting transmon qubits involves coupling the qubits to 3D cavities, with current state-of-the-art coherence times in excess of 0.1ms. For larger and more complex 3D structures with architectures containing multiple qubits and cavities, thermalization of the cavity walls and qubit chips becomes increasingly challenging. We are developing copper multi-cavity structures to ensure a good thermal pathway and various approaches for mounting the qubit chips inside for reproducible coherence data. At the same time, for improving the quality factors of the copper cavities by reducing the cavity surface loss, we are pursuing several techniques for polishing the copper surfaces and applying superconducting coatings.

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