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Toward Resource-Efficient Deterministic Entanglement in 3D Superconducting Qubits[1] M.E. SCHWARTZ, L. MARTIN, QNL, University of California, Berkeley, C. ARON, Department of Electrical Engineering, Princeton University, M. KULKARNI, New York City College of Technology, City University of New York, H.E. TURECI, Department of Electrical Engineering, Princeton University, I. SIDDIQI, QNL, University of California, Berkeley — We present progress towards deterministic entanglement in a three-dimensional, superconducting qubit architecture, using only one continuous drive to engineer steady-state entanglement [1]. Our protocol uses two (nominally) identical copper waveguide cavities that each contain a transmon qubit. The cavities are directly coupled to one another and hybridize into symmetric and antisymmetric modes. The coupling of the cavities introduces a cavity-mediated qubit coupling that splits the degeneracy between the singlet and triplet states in the odd-parity subspace. By driving the cavities symmetrically and carefully tuning the single drive amplitude and frequency to take advantage of the hybridized cavity density of states, we aim to achieve bipartite entanglement that is stable against both dephasing and finite qubit lifetime. In this talk, we present experimental progress towards this cavity-assisted, bath engineered generation of entanglement.

[1] C. Aron, M. Kulkarni, & H.E. Tureci. http://arxiv.org/abs/1403.6474

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