Abstract Submitted
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Generating entanglement via symmetry-selective bath engineering in superconducting qubits[1] IRFAN SIDDIQI, MOLLIE SCHWARTZ, LEIGH MARTIN, EMMANUEL FLURIN, Quantum Nanoelectronics Laboratory, UC Berkeley, CAMILLE ARON, Laboratoire de Physique Thorique, cole Normale Suprieure; Instituut voor Theoretische Fysica, KU Leven, MANAS KULKARNI, Department of Physics, New York City College of Technology, City University of New York, HAKAN TURECI, Department of Electrical Engineering, Princeton University — Bath engineering, which utilizes coupling to lossy modes in a quantum system to generate non-trivial steady states, is a potential alternative to gate- and measurement-based quantum science. In this talk, we discuss autonomous stabilization of entanglement between two superconducting transmon qubits in a symmetry-selective manner. Our experiments are implemented using two 3D transmons housed in separate copper cavities. The cavities are coupled via an aperture, and hybridize into nondegenerate symmetric and antisymmetric bath modes. We utilize the engineered symmetries of the dissipative environment to stabilize a target Bell state $\frac{1}{\sqrt{2}}\left(|ge\rangle \pm |eg\rangle\right)$ in the qubit sector; we further demonstrate suppression of the Bell state of opposite symmetry due to parity selection rules. This implementation is resource-efficient, achieves a steady-state fidelity $\mathcal{F} = \prime.\prime$, and is scalable to multiple qubits. http://arxiv.org/abs/1511.00702

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