Abstract Submitted
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Autonomous Fock state stabilization by reservoir engineering[1] E. HOLLAND, B. VLASTAKIS, R. HEERES, U. VOOL, Z. LEGHTAS, L. FRUNZIO, Department of Physics and Department of Applied Physics, Yale University, New Haven, CT 06511, G. KIRCHMAIR[2], Institut fur Quantenoptik und Quanteninformation, Osterreichische Akademie der Wissenschaften, Otto-Hittmair-Platz 1, A-6020 Innsbruck, Austria, M. MIRRAHIMI[3], R.J. SCHOELKOPF, Department of Physics and Department of Applied Physics, Yale University, New Haven, CT 06511 — Quantum computing requires the ability to create and maintain quantum states. However, due to persistent coupling to the environment a quantum state suffers from decoherence. In order to fight decoherence physicists have come up with different approaches such as circuit based quantum error correction and reservoir engineering. Here we present a reservoir engineering scheme which autonomously stabilizes Fock states in a superconducting waveguide cavity. We will discuss how a vertical transmon qubit is used as a nonlinear coupler between two superconducting waveguide cavities. This nonlinear coupling creates a direct, strong-dispersive interaction between the two cavities. We utilize this interaction to autonomously stabilize Fock states by applying classical continuous wave drives. We present preliminary experimental results.

[1]Work supported by ARO and IARPA.
[2]Institut fur Experimentalphysik, Universitat Innsbruck, Technikerstrasse 25, A-6020 Innsbruck, Austria.
[3]Inria Paris-Rocquencourt, 78153 Le Chesnay Cedex, France.

Eric Holland
Department of Physics and Department of Applied Physics,
Yale University, New Haven, CT 06511

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