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Fock-state stabilization in superconducting circuits using biased Josephson junctions JEAN-RENE SOUQUET, AASHISH CLERK, McGill Univ — The ability to prepare and stabilize non-trivial states is a crucial ingredient for quantum information processing. Here, we analyze theoretically a simple scheme for stabilizing Fock states in a superconducting circuit using the nonlinearity inherent in a voltage-biased Josephson junction. Unlike a recent demonstration of Fock state stabilization [1], our protocol does not require any microwave driving. We also discuss how the same system can be used to generate propagating single-photon states with high fidelity, again without the use of microwave drives or pulses.
[1] E. T. Holland, B. Vlastakis, R. W. Heeres, M. J. Reagor, U. Vool, Z. Leghtas, L. Frunzio, G. Kirchmair, M. H. Devoret, M. Mirrahimi, R. J. Schoelkopf. Phys. Rev. Lett. 115, 180501 (2015).

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