Fock State Generator SHAVINDRA PREMARATNE, Department of Physics, University of Maryland; Laboratory for Physical Sciences, F.C. WELLSTOOD, JQI, CNAM, Department of Physics, University of Maryland, B.S. PALMER, Department of Physics, University of Maryland; Laboratory for Physical Sciences — Using a single junction $Al/AlO_x/Al$ transmon qubit coupled to a superconducting Al cavity (at a temperature 15 mK), we have used a Raman technique to produce a single Fock state in the cavity. The technique requires 3 microwave tones to drive the system from the ground state of the cavity/qubit system. We achieve an experimental fidelity of the final Fock state of around 90%, limited by thermal photons in the cavity and by decay during the operation time. Using this technique, we have also generated an arbitrary superposition of Fock states and a superposition of qubit and cavity states. Results, simulations and applications of this technique will be discussed.

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