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Electromagnetically induced transparency and coherent population trapping with a superconducting artificial atom SERGEY NOVIKOV, University of Maryland, College Park, TIMOTHY M. SWEENEY, J.E. ROBINSON, Laboratory for Physical Sciences, BALADITYA SURI, University of Maryland, College Park, F.C. WELLSTOOD, JQI, CNAM, Dept. of Physics, University of Maryland, College Park, B.S. PALMER, Laboratory for Physical Sciences — We embed a superconducting $Al/AlO_X/Al$ transmon qubit that acts as an artificial atom in a three-dimensional copper microwave cavity at a temperature of 22 mK. By addressing the hybridized qubit-cavity levels with two microwave drives (probe and coupler), we are able to create a Λ-like system with highly asymmetric decay rates. We observe electromagnetically induced transparency, and use this feature to achieve coherent population trapping (CPT) by creating a superposition state with the two drives whose duration is much longer than any coherence times in the system. After the drives are turned off, the resultant CPT dark state is coherent for $T_{CPT} \approx T_2^* = 7.4\ \mu s$. We estimate the *minimum* fidelity of the dark state achievable in this system to be 60%. These results present a way of superposition and entanglement generation with CW tones in a superconducting system.

Sergey Novikov
University of Maryland, College Park

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