

## ADIABATIC PROCESSES WITH A THREE-LEVEL ARTIFICIAL ATOM

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The technology of quantum superconducting circuits has reached a level of sufficient maturity to allow the high-fidelity creation and control of quantum states. In particular, the realization of adiabatic protocols such as STIRAP (stimulated Raman adiabatic passage) and variations thereof in mesoscopic systems [1] has been a long-term goal for many research groups. Here we present a realization [2] of STIRAP in a superconducting transmon, a circuit that can be operated as a three-level system. In this system we transfer the population from the ground state to the second excited state – bypassing the first excited state – using a sequence of Gaussian microwave pulses. We present also results on hybrid adiabatic-nonadiabatic pulses.

[1] G. Falci, P. G. Di Stefano, A. Ridolfo, A. D'Arrigo, G. S. Paraoanu and E. Paladino, Advances in quantum control of three-level superconducting circuit architectures, *Fortschr. Phys.* (2016) 1–10.

[2] K. S. Kumar, A. Vepsäläinen, S. Danilin, and G.S.Paraoanu, Stimulated Raman adiabatic passage in a three-level superconducting circuit, *Nature Communications* **7** (2016) 10628.