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Characterization of the Cross Resonance Effect for Superconducting Transmon Qutrits[1] MERRELL BRZECZEK, University of California, Berkeley, ALEXIS MORVAN, Lawrence Berkeley National Laboratory, RAVI NAIK, BRADLEY MITCHELL, University of California, Berkeley, DAVID SANTIAGO, IRFAN SIDDIQI, Lawrence Berkeley National Laboratory — A qutrit architecture proposes several resource-efficiency related advantages over qubit processors, but still lacks reliable high-fidelity entanglement gates. Currently, one of the foremost mechanisms for qubit entangling gates is the cross resonance effect, which has enabled high-fidelity quantum computation. The cross resonance interaction can be described by an effective Hamiltonian, which has been thoroughly studied for qubit systems. However, such characterization is still missing for qutrit systems. In this work, we experimentally characterize the cross resonance effect between two fixed frequency transmons from a qutrit perspective.This work is a step towards engineering high-fidelity two-qutrit entangling gates.

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