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TITLE:
Anneal paths in capacitively shunted flux qubits

ABSTRACT:

Quantum annealers require accurate control and optimization of system parameters to reduce noise levels and ultimately demonstrate a computational advantage over classical algorithms.
This requires a careful characterization of the system and its behavior in response to control biases.
In this work we study a capacitively shunted flux qubit (CSFQ), and use spectroscopy and dispersive readout to extract system parameters and model the qubit.
We study the multi-level structure of the circuit model of the CSFQ by annealing the qubit through small gaps and observe quantum signatures of level crossing between different circuit eigenenergies.
Our model and results can be used to find optimized annealing paths that cancel asymmetry induced non-linear crosstalk between the qubit control biases.