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Non-Markovian Qubit Dynamics in Multimode Superconducting circuit cavities MOEIN MALEKAKHLAGH, HAKAN TURECI, Princeton University, DMITRY KRIMER, MATTHIAS LIERTZER, STEFAN ROTTER, Vienna University of Technology — Circuit QED provides a unique platform to investigate the quantum dynamics of an emitter while it is coupled to a large number of modes of an open multimode superconducting microwave resonator . In this talk, we will use a recently developed Green's function method for open photonic systems [1] to study the dynamics of a superconducting transmon qubit coupled to a long superconducting microwave resonator. Then, we find the crossover between three distinct regimes as the qubit-resonator coupling strength is gradually increased: 1. Overdamped decay with a timescale associated with Purcell modified decay rate 2. Underdamped oscillations with a timescale given by the effective vacuum Rabi frequency 3. Pulsed revivals with a timescale given by the resonator round-trip time
[1] arXiv:1306.4787 [quant-ph]

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