SFB 767
Seminar

Universität Konstanz

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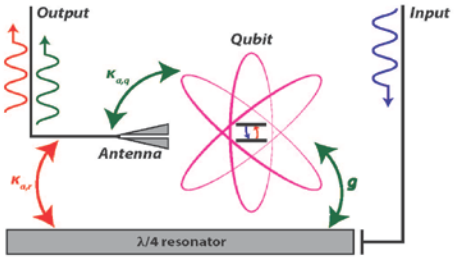
Frequency- and time-domain characterization of a transmon qubit in a transmission line



Superconducting circuit quantum electrodynamics (QED) has developed into a powerful platform for studying the interaction between matter and different states of light. The operation principle of circuit QED is based on two robust phenomena: superconductivity and the Josephson effect, that provides the circuit with nonlinearity without introducing dissipation and dephasing. One of the most interesting object that can be used for future applications is the super-conducting qubit. There exists a large variety of different superconducting qubit types. The flexibility in fabrication and the ability to in-situ tune their properties make them attractive for a variety of experiments. Here, we focus on studying the interaction of a superconducting transmon qubit to an engineered bosonic environment provided by an open transmission line. We use an antenna for readout and thus know it is qubit's dominant decay channel. The qubit state evolution will be characterized in two different experiments. In the continuous wave measurements, we investigate the qubit in the steady state. Furthermore, we introduce an experimental setup that allows us to examine the qubit dynamics in a timeresolved manner. To this end, we are able to establish standard protocols, e.g., driven Rabi and T_1 determination.

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