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Photon Statistics of Propagating Thermal Microwaves[1] F. DEPPE, J. GOETZ, P. EDER, M. FISCHER, S. POGORZALEK, E. XIE, K.G. FEDOROV, A. MARX, R. GROSS, Walther-Meissner-Institut, TU Muenchen, Nanosystems Initiative Munich (NIM) — In experiments with superconducting quantum circuits, characterizing the photon statistics of propagating microwave fields is a fundamental task. This task is in particular relevant for thermal fields, which are omnipresent noise sources in superconducting quantum circuits covering all relevant frequency regimes. We quantify the $n^2 + n$ photon number variance of thermal microwave photons emitted from a black-body radiator for mean photon numbers $0.05 \leq n \leq 1.5$ [1]. In addition, we also use the fields as a sensitive probe for second-order decoherence effects of the qubit. Specifically, we investigate the influence of thermal fields on the low-frequency spectrum of the qubit parameter fluctuations. We find an enhacement of the white noise contribution of the noise power spectral density. Our data confirms a model of thermally activated two-level states interacting with the qubit [2].
[1] J. Goetz et al., arXiv: 1609.07353 (2016). [2] J. Goetz et al., arXiv: 1609.07351 (2016).

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