Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Spin-boson model with an engineered reservoir in circuit QED[1]

FRANK DEPPE, M. HAEBERLEIN, P. EDER, J. GOETZ, M. FISCHER, F. WULSCHNER, E. XIE, K. G. FEDOROV, A. MARX, R. GROSS, Walther-Meissner-Institut; Technische Universitaet Muenchen; Nanosystems Initiative Munich, Germany — A superconducting qubit coupled to an open transmission line represents an implementation of the spin-boson model with an engineered environment. Using a flux qubit with a large mutual inductance to the transmission line, we confirm in a resonance fluorescence experiment that the spectral function $J(\omega)$ of this environment is Ohmic over a frequency range of several gigahertz. Furthermore, partial reflectors implemented into the transmission line modify the spectral function of the transmission line. For weak enough reflectors, we find that the resulting broad peak can be interpreted in terms of an enhanced spontaneous emission rate. Our work [M. Haeberlein *et al.*, arXiv:1506.09114 (2015)] lays the ground for future quantum simulations of other, more involved, impurity models with superconducting circuits.

[1]We acknowledge support by the German Research Foundation through SFB 631 and FE 1564/1-1, the EU project PROMISCE, and Elite Network of Bavaria through the program ExQM.

Frank Deppe
Walther-Meissner-Institut; Technische Universitaet Muenchen; Nanosystems Initiative Munich, Germany

Date submitted: 05 Nov 2015 Electronic form version 1.4