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Coherence oscillations produced by non-Gaussian quantum noise
FLORIAN MARQUARDT, Department of Physics, Arnold Sommerfeld Center for Theoretical Physics, and Center for NanoScience, Ludwig-Maximilians University Munich, IZHAR NEDER, Braun Center for Submicron Research, Department of Condensed Matter Physics, Weizmann Institute, Rehovot, Israel, BENJAMIN ABEL, Department of Physics, Arnold Sommerfeld Center for Theoretical Physics, and Center for NanoScience, Ludwig-Maximilians University Munich, MORDEHAI HEIBLUM, Braun Center for Submicron Research, Department of Condensed Matter Physics, Weizmann Institute, Rehovot, Israel — The usual models for dissipative environments involve a bath of harmonic oscillators, producing Gaussian fluctuations. However, modern experiments on dephasing in qubits and electronic interferometers indicate strong coupling to non-Gaussian quantum noise. Most strikingly, the coherence (interference contrast) may oscillate as a function of time and other control parameters. We present the theory behind a recent "controlled dephasing" experiment involving an electronic Mach-Zehnder interferometer strongly coupled to the non-Gaussian shot noise of a detector edge channel [cond-mat/0610634,cond-mat/ 0611372], as well as applications to qubits dephased by shot noise or two-level fluctuators.

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