
Fluctuation relations in a superconducting circuit QED system

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Abstract

We have experimentally investigated fluctuation relations of a quantum system in the presence of decoherence. In the so-called two-measurement protocol (TMP), taking into account only the fluctuations of the internal energy, deviations from the Jarzynski-type relations are caused by dissipation and dephasing of the system [1]. In our experiment, a transmon qubit in a 3D superconducting resonator undergoes a protocol with two serial non-demolition measurements and two unitary control pulses in between. The deviations in the fluctuation relations are studied as a function of the delay times between the measurements and the controls.

J. P. Pekola, Y. Masuyama, Y. Nakamura, J. Bergli, Y. M. Galperin,
arXiv:1503.05940; to appear in Phys. Rev. E.

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