

# Charge dissipation in Josephson Circuits and its Impact on Phase Dynamics

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We theoretically investigate the escape rate occurring via quantum tunneling in a system affected by tailored dissipation. Specifically, we study the environmental assisted quantum tunneling of the superconducting phase in a current-biased Josephson junction. We consider Ohmic resistors inducing dissipation both in the phase and in the charge of the quantum circuit. We find that the charge dissipation leads to an enhancement of the quantum escape rate. This effect appears already in the low Ohmic regime and also occurs in the presence of phase dissipation that favors localization [1]. We further discuss the influence of temperature on the observed effect and possible technological applications.

[1] D. Maile, J. Ankerhold, S. Andergassen, W. Belzig, and G. Rastelli, Phys. Rev. B 106, 045408 (2022)