Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Dephasing of a superconducting flux qubit

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We have measured \( T_{\text{echo}}^2 \) by means of the phase cycling method. At the optimal point, we found the relation \( T_{\text{echo}}^2 \sim 2T_1 \). This means that the echo decay time is limited by the energy relaxation (\( T_1 \) process). Moving away from the optimal point, we observe a linear increase of the phase relaxation rate (\( 1/T_{\text{echo}}^2 \)) with the applied external magnetic flux. This behavior can be well explained by the influence of magnetic flux noise with a \( 1/f \) spectrum on the qubit.

K.Kakuyanagi, et al., cond-mat/0609564

1This work was partially supported by JSPS KAKENHI (18201018), MEXT KAKENHI (18001002) and JST-CREST.

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Date submitted: 25 Dec 2006