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LC Filtered dc SQUID Phase Qubit with Low Dielectric Loss¹ HYEOKSHIN KWON, A. J. PRZYBYSZ, University of Maryland, College Park, T. A. PALOMAKI, Charmers University, HANHEE PAIK, K. D. OSBORN, Laboratory for Physical Sciences, R. M. LEWIS, Northrop Grumman Corp, B. K. COOPER, J. R. ANDERSON, C. J. LOBB, F. C. WELLSTOOD, University of Maryland, College Park — We have investigated a dc SQUID phase qubit with LC filter, which has a relatively small ($\sim 4~\mu m^2$) Al/AlO_x/Al Josephson junction shunted by an additional capacitor built using low-stress thin film SiN_x. The LC isolation provides an additional isolation factor at the junction plasma frequency and allows flexibility in the choice of SQUID parameters. We report Rabi oscillations with a 42 ns envelope decay time (T'), and a 32 ns energy relaxation time (T₁), consistent with a loss tangent of about 7 x 10⁻⁴ in the loss-stress SiN_x. We also report on progress towards getting longer coherence times using a high-stress SiN_x with a lower loss tangent.

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