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DC SQUID Phase Qubit with LC Filter HYEOKSHIN KWON, A.J. PRZYBYSZ, HANHEE PAIK, R.M. LEWIS, T.A. PALOMAKI, S.K. DUTTA, B.K. COOPER, J.R. ANDERSON, C.J. LOBB, F.C. WELLSTOOD, University of Maryland, College Park — We investigate the use of an inductor-capacitor (LC) network to increase the isolation of a dc SQUID phase qubit from its current bias leads and thereby increase the dissipation time T_1 and coherence time T_2. One junction in the SQUID acts as an ideal phase qubit while the second junction and the SQUID loop inductance act as a broadband filter to isolate the first junction from the current bias leads. The LC-isolation network provides an additional isolation factor and allows flexibility in the choice of SQUID parameters. In addition to increasing the isolation from the leads, our design minimizes the effects of dielectric loss and two-level systems by using a relatively small Josephson junction, building the devices from $Al/Al_2O_3/Al$ on sapphire, and only using insulating layers (SiN_x) in external capacitors for the phase qubit junction and LC network. *Funding provided by JQI, CNAM and the DOD.

Hyeokshin Kwon
University of Maryland, College Park

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