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Microwave Reflectometry Measurements of Flux States of a dc SQUID Phase Qubit[1] B. K. COOPER, R. M. LEWIS, S. K. DUTTA, T. A. PALOMAKI, ANTHONY PRZYBYSZ, H. KWON, HANHEE PAIK, J. R. ANDERSON, C. J. LOBB, F. C. WELLSTOOD, Center for Nanophysics and Advanced Materials, University of Maryland — We examine microwave reflectometry readout of a dc SQUID phase qubit. Our device is a Nb/AlOx/Nb SQUID fabricated by Hypres with loop inductance of 1.3 nH and symmetric junction critical currents of approximately 5 μA. The SQUID is current and flux biased, with one junction used as the qubit and the other used to provide isolation. The isolation junction is shunted by a large capacitor to depress its plasma frequency to about 1.5 GHz. This frequency can be shifted by flux-induced circulating current in the SQUID loop, allowing us to determine which flux state we are in by making reflectometry measurements of the resonant behavior of the isolation junction. The utility of this measurement for qubit state readout is discussed.

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