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1/f Critical Current Noise in Nb-Al-AlO_x-Nb Trilayer Junctions

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— Low frequency (1/f) fluctuations in the critical current of Josephson junctions introduce phase noise into the coherent oscillations of superconducting qubits incorporating them, leading to dephasing. In order to quantify the degree to which this noise will affect the dephasing of qubits, we have measured the 1/f critical current noise in Nb-Al-AlO_x-Nb trilayer Josephson junctions using a SQUID potentiometer circuit mounted in a dilution refrigerator. We present measurements taken over a range of temperatures from 1K to 10mK on junctions of different sizes in order to verify the behavior and origin of the 1/f noise. Work supported by the National Science Foundation grant EIA01- 21568.

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