Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Probing Temperature Dependent Noise in Flux Qubits via Macroscopic Resonant Tunneling A.J. BERKLEY, R. HARRIS, M.W. JOHNSON, J. JOHANSSON, P. BUNYK, S. GOVORKOV, M.C. THOM, S. UCHAIKIN, C.J.S. TRUNCIK, M.H.S. AMIN, D-Wave Systems Inc., 100-4401 Still Creek Dr., Burnaby, BC V5C 6G9, Canada, S. HAN, Department of Physics and Astronomy, University of Kansas, Lawrence KS, USA, B. BUMBLE, A. FUNG, A. KAUL, A. KLEINSASSER, Jet Propulsion Laboratory, California Institute of Technology, Pasadena CA, USA, D.V. AVERIN, Department of Physics and Astronomy, SUNY Stony Brook, Stony Brook NY, USA — Macroscopic resonant tunneling between the two lowest lying states of a bistable RF-SQUID is used to characterize flux noise in a potential qubit. Detailed measurements of incoherent decay rates as a function of flux bias revealed that the Gaussian shaped tunneling rate is not peaked at the resonance point, but is shifted to a flux bias at which the initial well is higher than the target well. This observation indicates that the dominant low frequency (1/f) flux noise in this device is quantum mechanical in nature. The r.m.s. amplitude of the noise, which is proportional to decoherence rate $1/T_2^*$, was observed to be weakly dependent on temperature below 70 mK.

Andrew Berkley
D-Wave Systems Inc., 100-4401 Still Creek Dr., Burnaby, BC V5C 6G9, Canada

Date submitted: 26 Nov 2007 Electronic form version 1.4