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Very-low-frequency spectroscopy of both flux and tunnel-coupling noise in a flux qubit JONAS BYLANDER, FEI YAN, SIMON GUSTAVSSON, Massachusetts Institute of Technology, FUMIKI YOSHIHARA, Institute of Physical and Chemical Research (RIKEN), Japan, DAVID G. CORY, IQC, University of Waterloo, and Perimeter Institute, Canada, YASUNOBU NAKAMURA, NEC Corp. and RIKEN, Japan, WILLIAM D. OLIVER, MIT and MIT Lincoln Laboratory — We inferred the very-low-frequency noise (0.01 to 100 Hz) of a superconducting flux qubit by repeatedly subjecting it to free induction during a fixed length of time and sampling the binary readout signal. The excited-state probability varies as the qubit-transition frequency fluctuates due to noise, and we control the sensitivities to noise in the energy and tunnel coupling terms of the Hamiltonian by tuning the static flux (energy) bias. At low temperature, interestingly, both types of low-frequency noise follow the same 1/f-type power laws observed at much higher frequencies. We will further present the temperature dependence of both noises from 10 to 200 mK.

Jonas Bylander
Massachusetts Institute of Technology

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