

Abstract Submitted
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Josephson junction microscope for probing and quantum manipulation of low-frequency fluctuators¹ LIN TIAN, Department of Applied Physics and E. L. Ginzton Laboratory, Stanford University, Stanford, CA 94305, RAYMOND SIMMONDS, National Institute of Standards and Technology, 325 Broadway, Boulder, Colorado 80305-3328 — The high-Q harmonic oscillator mode of a Josephson junction can be used as a novel probe of spurious two-level systems (TLSs) inside the amorphous oxide tunnel barrier of the junction. In particular, we show that spectroscopic transmission measurements of the junction resonator mode can reveal how the coupling magnitude between the junction and the TLSs varies with an external magnetic field applied in the plane of the tunnel barrier. The proposed experiments offer the possibility of clearly resolving the underlying coupling mechanism for these spurious TLSs, an important decoherence source limiting the quality of superconducting quantum devices. Meanwhile, quantum manipulation of the TLSs via the junction oscillator mode can also be achieved. L. Tian and R. W. Simmonds, *Phys. Rev. Lett.* 99, 137002 (2007).

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