Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Non-equilibrium two-level system dynamics probed with a biased bridge resonator MOE S. KHALIL, SERGIY GLADCHENKO, M.J.A. STOUTIMORE, University of Maryland and Laboratory for Physical Sciences, F.C. WELLSTOOD, University of Maryland, K.D. OSBORN, Laboratory for Physical Sciences
— We have designed a biased bridge resonator (BBR), which allows us to probe amorphous dielectric films by simultaneously applying a quasi-static electric bias field in addition to a microwave electric field. The BBR is made with a bridge arrangement of capacitors using superconducting aluminum electrodes and operated at millikelvin temperatures. Measurements of a universal amorphous dielectric film at high microwave amplitudes and a sufficiently fast bias field ramp reveals a non-equilibrium dielectric loss equal to its intrinsic steady state value. This phenomenon is explained by a theory which uses the dynamics of charged two-level systems undergoing Landau-Zener transitions to remain in their ground state. We will compare the experimental data to Monte Carlo simulations of the theory which allow for the separate extraction of the dipole moment and the spectral density of two-level systems.

Moe S. Khalil
University of Maryland and Laboratory for Physical Sciences

Date submitted: 09 Nov 2012 Electronic form version 1.4