Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Quantum regime dielectric loss studies of bulk substrates with a high-Q superconducting cavity[1] HANHEE PAIK, LUIGI FRUNZIO, ROBERT SCHOELKOPF, Yale University — Recent measurements of transmission-line resonators and superconducting qubits have demonstrated that dielectric films can have anomalous losses which increase in the single photon regime [1]. Bulk substrate materials such as single-crystal sapphire have been shown to have much smaller losses in many- photon experiments, but there have not been detailed measurements of these materials in the single-photon limit. We present measurements of dielectric loss in single crystal wafers in this limit using the cavity perturbation technique at 20 mK. We employ a three-dimensional superconducting resonant cavity whose quality factor is higher than 10^6. Results on various materials such as sapphire and high-resistivity silicon will be compared. [1] A. D. O'Connell, et al. Appl. Phys. Lett. 92, 112903 (2008)

[1]This project is funded by the IARPA.

Hanhee Paik
Yale University

Date submitted: 19 Nov 2009 Electronic form version 1.4