Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

**Temperature dependence of the dielectric properties of strained barium strontium titanate films for tunable microwave applications** LISA ALLDREDGE, WONTAE CHANG, STEVEN KIRCHOEFER, JEFFREY POND, Naval Research Laboratory — Understanding strain effects is critical to achieve desirable dielectric properties in ferroelectric films, which are of interest for tunable microwave applications. Sputter-deposited $Ba_{1-x}Sr_xTiO_3$ films on (001) MgO were studied in various strain states: in-plane or out-of-plane tetragonal lattice distortions. The optimal system calibration for microwave measurements changes greatly with temperature, requiring frequent recalibration. A temperature-dependent interpolation calibration technique was developed to increase the efficiency of measurements taken as a function of temperature. The films showed significant differences in the ferroelectric phase transition due to lattice distortions, with a strong temperature dependence of the in-plane dielectric behavior for films under tensile strain and a weak temperature dependence for films under compressive strain. We believe that films under tensile strain have polarizations aligned parallel to the applied electric field and so the in-plane dielectric properties are strongly coupled with the field, while films under compressive strain have polarizations perpendicular to the field, resulting in minimal influence on the in-plane dielectric behavior.

Lisa Alldredge
Naval Research Laboratory

Date submitted: 21 Nov 2008 Electronic form version 1.4