Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Non-linear optical probing of strain-enabled ferroelectricity in $CaTiO_3$ thin films EFTIHIA VLAHOS, The Pennsylania State University, CHARLES BROOKS, The Pennsylvania State University, CARL JOHAN ECKLUND, Rutgers University, MIKE BIEGALSKI, Oak Ridge National Lab, KARIN RABE, Rutgers University, DARRELL SCHLOM, Cornel University, VENKATRAMAN GOPALAN, The Pennsylvania State University — First principles calculations predict $CaTiO_3$, under tensile strain, to become ferroelectric with a spontaneous polarization of up to 0.5 C/m^2. Comparative second harmonic generation (SHG) studies of a series of strained $CaTiO_3$ thin films were undertaken in order to determine their transition temperature and point group symmetry. The epitaxial strain ranged from -1.7% to 3.3%. Symmetry analysis of the SHG polar plots confirms that for the samples under tensile strain, the polarization is along the $<110>_p$directions and the point group of the ferroelectric phase is *mm2*. SHG "hysteresis" loops were also obtained; these show clear switching. The experimental results are in excellent agreement with the first principles calculations predictions, and low temperature dielectric measurements that were performed on the same samples.

Eftihia Vlahos
The Pennsylvania State University

Date submitted: 20 Nov 2009 Electronic form version 1.4