

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Origins of enhanced electromechanical coupling in ferroelectric BaTiO<sub>3</sub>** ABHIJIT PRAMANICK, SOULEYMANE DIALLO, OLIVIER DELAIRE, STUART CALDER, ANDREW CHRISTIANSON, Oak Ridge National Laboratory, XUN-LI WANG, City University of Hong Kong, JAIME FERNANDEZ-BACA, Oak Ridge National Laboratory — The origins of enhanced piezoelectric coupling along non-polar crystallographic directions in ferroelectric BaTiO<sub>3</sub> are investigated using in situ neutron spectroscopy. It is observed that an electric field applied away from the equilibrium polarization direction causes a stiffening of the transverse acoustic (TA) phonon branch and consequently increases interaction between the TA and the transverse optic (TO) soft mode for a range of wave vectors extending from the Brillouin zone center. This provides a direct lattice dynamics mechanism for enhanced electromechanical coupling, and could act as a guide for designing improved piezoelectric materials.

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Date submitted: 14 Nov 2013

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