Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Capturing photoinduced structural distortion within a unit cell of $BiFeO_3$[1] HAIDAN WEN, Argonne Natl Lab, MICHEL SASSI, Pacific Northwest National Laboratory, ZHENLIN LUO, University of Science and Technology of China, CAROLINA ADAMO, Stanford University, DARRELL SCHLOM, Cornell Univerisity, ROSSO KEVIN, Pacific Northwest National Laboratory, XIAOYI ZHANG, Argonne Natl Lab — The interaction of light with correlated materials has been an intensely studied research forefront in which the coupling of radiation energy to selective degrees of freedom offers a novel contact-free control knob to tune functionalities on ultrafast time scales. We studied a photoexcited multiferroic $BiFeO_3$ thin film using time-resolved x-ray absorption spectroscopy aided by density functional theory calculations. The study revealed a uniaxial deformation of the unit cell at a constant volume with a minimal oxygen octahedron rotation, consistent with the influence of photoinduced carriers to the ferroelectric polarization. These important findings illustrate a microscopic picture of local structural reconfiguration around iron atoms at atomistic length scales during a photocarrier-mediated nonequilibrium process in polar materials.

[1]Work was supported by the U.S. DOE Office of Science, Office of Basic Energy Sciences, under Contract No. DE-AC02-06CH11357 (ANL) and from the Division of Chemical Sciences, Geosciences and Biosciences (PNNL).

Haidan Wen
Argonne Natl Lab

Date submitted: 13 Nov 2014 Electronic form version 1.4