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Neutron Scattering Study on Low Energy Phonons in $BiFeO_3$
GUANGYONG XU, Brookhaven Natl Lab, ZHIJUN XU, UC Berkeley, JINSHENG WEN, Nanjing University, PETER GEHRING, NIST Center for Neutron Research, STEPHEN SHAPIRO, Brookhaven Natl Lab, MASAAKI MATSUDA, Oak RIdge Natl Lab, TOSHIMITSU ITO, AIST, ROBERT BIRGENEAU, UC Berkeley, BARRY WINN, Oak RIdge Natl Lab, GENDA GU, Brookhaven Natl Lab —
We have performed neutron scattering studies on low energy phonon modes in the multiferroic $BiFeO_3$. We show measurements near (100), (110), (200) Bragg peaks on the TA, LA and lowest energy TO modes in a broad temperature range from 300 K to 700 K. The intensities, dispersion, and life times (inversed energy width) of these phonon modes are plotted vs. temperature, and anomalies related to the AFM order (Neel temperature of 640 K) are discussed. We also will also discuss additional low energy modes observed that may be related to the "electro-magnon" excitations in this material. This work is supported by the Office of Basic Energy Sciences, DOE.

Guangyong Xu
Brookhaven Natl Lab

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