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Nanoscale structural dynamics of ferroelectric thin films ALEXEY GRIGORYEV, DAL-HYUN DO, DONG-MIN KIM, CHANG-BEOM EOM, PAUL EVANS, University of Wisconsin-Madison, ERIC DUFRESNE, BERNHARD ADAMS, Advanced Photon Source, Argonne National Laboratory — The emerging capability to visualize dynamical phenomena at small scales in both distance and time simultaneously has important implications in understanding ferroelectric materials. We have used time-resolved synchrotron x-ray microdiffraction to probe polarization switching and piezoelectric response at the sub-nanosecond time scale and the sub-micrometer spatial scale in lead zirconium titanate thin films. Based on time resolved maps of the polarization and piezoelectric distortion, the polarization switching domain wall velocity can be measured directly. The magnitude of this velocity and its scaling with electric fields suggest that significant improvements in switching speed can be made in optimized thin film structures.

Prefer Oral Session
 Prefer Poster Session

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