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Structural characterization of $PbTiO_3/SrTiO_3$ superlattices under an applied external field STEPHANIE FERNANDEZ-PENA, University of Geneva, PAVLO ZUBKO, University College London, CELINE LICHTENSTEIGER, JEAN-MARC TRISCONE, University of Geneva — Understanding ferroelectricity in ultrathin films is important both from the fundamental as well as the technological points of view. At these thicknesses, electrostatics plays a key role and often leads to the formation of 180 degree domains that form in order to minimize the depolarization field and subsequently dominate the functional properties of ultrathin ferroelectrics. Superlattice structures combining ferroelectrics and dielectrics, where such domains form a regular pattern that can be probed using X-ray diffraction, are an ideal system for studying ferroelectric nanodomains and their response to applied electric fields (P.Zubko, et al., PRL104, 2010) . Reciprocal space maps reveal domain satellites up to third order around the main superlattice peak and their evolution under applied fields is followed from RT to 30 K. Our detailed study maps the domain evolution as well as the piezoelectric response of superlattices with different $PbTiO_3/SrTiO_3$ periodicities.

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