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Growth and Characterization of $EuTiO_3$ films on $SrTiO_3$ (001)
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— Perovskite oxides display a variety of interesting physical properties, and their heteroepitaxial structures are of significant interest in oxide electronics. $EuTiO_3$and $SrTiO_3$ are nearly perfectly lattice matched and have the same valence structure, and are therefore well suited as a model system for the study of perovskite interfaces. One outstanding question about such interfaces concerns the factors that determine and limit atomic and electronic abruptness. In this work, several monolayer thick $EuTiO_3$ films are grown on single-crystal $SrTiO_3$ (001) substrates using Pulsed Laser Deposition (PLD). The growth mechanisms are probed by the combination of synchrotron based *in situ* small angle x-ray scattering (SAXS) and *in situ* Reflection High Energy Electron Diffraction (RHEED). The atomic-scale interfacial properties are investigated by high resolution Scanning Transmission Electron Microscopy (STEM) and spatially resolved Electron Energy Loss Spectroscopy (EELS).

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