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Layer-by-layer growth by pulsed laser deposition in the unit-cell limit.¹ M. KAREEV, University of Arkansas, S. PROSANDEEV, J. LIU, P. RYAN, J.W. FREELAND, J. CHAKHALIAN — Unlike conventional growth of complex oxide heterostructures, the ultimate unit cell limit imposes strict constraints for a multitude of parameters critical to layer-by-layer growth. Here we report on detailed analysis of far-from-equilibrium growth by interrupted pulsed laser deposition with application to $\text{RENiO}_3/\text{LaAlO}_3$ superlattices grown on a diverse set of substrates SrTiO_3 , NdGaO_3 , LSAT and LaAlO_3 . A combination of *in-situ* high-pressure RHEED and AFM along with extensive data obtained from synchrotron based XRD and resonant XAS allows us critically assess the meaning of RHEED intensity oscillation and the effect of a polar/non-polar interface on the heteroepitaxial growth. The role of defects formed during the initial stages of growth is also addressed.

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