Layer-by-layer growth by pulsed laser deposition in the unit-cell limit.\textsuperscript{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 constrains 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 RENiO\textsubscript{3}/LaAlO\textsubscript{3} superlattices grown on a diverse set of substrates SrTiO\textsubscript{3}, NdGaO\textsubscript{3}, LSAT and LaAlO\textsubscript{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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