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SUB-MILLISECOND TIME RESOLVED X-RAY SURFACE DIFFRACTION DURING PULSED LASER DEPOSITION

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The initial crystallization and evolution of the $SrTiO_3$ (001) surface during homoeptaxial pulsed laser deposition growth of $SrTiO_3$ was studied using time resolved surface x-ray diffraction with a time resolution down to 200 microseconds. Measurements performed at the UNICAT undulator line at the Advanced Photon Source indicated prompt formation of epitaxial $SrTiO_3$ bi-layers down to our limiting time resolution. The subsequent evolution of the surface occurred on a much greater time scale, and was studied both by measurements of surface truncation rod intensities and by measurements of diffuse scattering near the rod. The effect of temperature and correlation with in-plane order will also be discussed.

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