Abstract Submitted
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In situ studies on ferroelectric $BaTiO_3$ interface[1] JUNSOO SHIN, VON BRAUN NASCIMENTO, WARD PLUMMER, JIANDI ZHANG, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA 70803, ALBINA BORISEVICH, VINCENT MEUNIER, SERGEI KALININ, ARTHUR BADDORF, Oak Ridge National Laboratory, Oak Ridge, TN 37831 — Ferroelectric phase stability in ferroelectric films is critically dependent on the surface and interface phenomena, especially governed by electrostatic depolarization energy. Predictions for the minimum critical film thickness for ferroelectricity have continuously decreased down to few unit cells. We have examined surface/interface atomic structures of ultrathin $BaTiO_3$ (BTO) films grown on conductive $SrRuO_3$ (SRO) and Nb-doped $SrTiO_3$. The surface structure of BTO/SRO was refined using in-situ Low Energy Electron Diffraction (LEED) I-V, resulting to observation of polar distortion in ultrathin ($\geq$ 4 ML) BTO films. The in-situ Scanning Tunneling Microscopy (STM) has been performed prior and after BTO deposition on SRO. However, the unusual 2x2 reconstruction is observed for 1-2 ML BTO films and bare SRO by STM. The surface reconstruction of SRO bottom electrode is shown to affect the interface of films deposited subsequently which could be reflected in ultrathin film properties. The in-situ LEED I-V structural studies on 1-2 ML BTO interface have been performed without SRO layer, which kept ultrathin BTO films from the preclusion of reconstructed SRO films.

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Junsoo Shin
Dept of Physics and Astronomy, Louisiana State University,
Baton Rouge, LA 70803

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