Abstract Submitted
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Optimization of atomically smooth and metallic surface of $SrTiO_3$ for the growth of ultra-thin manganite films[1] IN HAE KWAK, SIMA VARNOOSFADERAN, ARTHUR HEBARD, AMLAN BISWAS, Department of Physics, University of Florida, Gainesville FL 32611 — Atomically smooth, TiO_2 terminated $SrTiO_3$ substrates can be prepared using a combination of chemical and thermal annealing treatments. Such substrates have been widely used to grow sharp oxide interfaces between $SrTiO_3$ and materials such as $LaAlO_3$. Insulating $SrTiO_3$ can also be made metallic by inducing oxygen vacancies or by doping with metals such as niobium. However, such treatments usually generate a rough surface. Thus, further growth of epitaxial thin films or study of the surface itself has been limited. Here, we report the optimal conditions to fabricate atomically smooth and metallic $SrTiO_3$ surfaces which show steps of one unit cell height. We directly confirmed the metallic characteristic of $SrTiO_3$ using sheet resistance vs. temperature ($R(T)$) measurements. The $R(T)$ data provides information on the physical origin of metallic behavior in $SrTiO_3$, which might also be relevant to the current research interest in 2DEG $SrTiO_3$ and oxide interfaces. We will also discuss the thin film growth of strain-induced insulating manganites on top of atomically smooth and metallic $SrTiO_3$ using pulsed laser deposition.

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