Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Low-energy electron diffraction study of the surface of $SrTiO_3$(001) ADAM BELL, KRISTIN MARINO, RENEE DIEHL, Department of Physics, Penn State University, University Park, PA 16802 — Oxide materials having the perovskite structure have many intriguing physical properties, such as high-temperature superconductivity, colossal magnetoresistance, and ferroelectricity. These properties make them good candidates for applications such as hard drive read heads or random access memory. Although fabrication of such devices involves growing thin films, the characterization of the surface structures of perovskite materials has been slow. This is partly because they often have complex or unstable structures that can be difficult to prepare and maintain and partly because the electron or ion beams common in surface techniques can charge the surface and perturb the incident and scattered beams This is particularly true of low-energy electron diffraction (LEED), the primary technique for determining the surface structures In this study, we have developed new methods to reduce the exposure of the insulating surface to electrons in a LEED experiment. These include using low incident beam currents, pulsing the electron beam and image enhancement techniques. We will carry out a LEED characterization of the $SrTiO_3$(001) surface structure, which has been the subject of some controversy concerning the terminating structure.[1]

[1]R. Herger et al., Phys. Rev. B 76, 195435 (2007).

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Date submitted: 12 Nov 2012 Electronic form version 1.4