Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

**Misfit strain accommodation in epitaxial $ABO_3$ perovskites: lattice distortions and lattice modulations** A. VAILIONIS, Stanford University, H. BOSCHKER, E. HOUWMAN, G. KOSTER, G. RIJNDERS, D.H. BLANK, University of Twente — Transition-metal oxides exhibit variety of magnetic, electronic and structural properties due to the presence of strong electron-electron and electron-lattice correlations. For epitaxial $ABO_3$ films substrate-induced biaxial stress is an effective tool to modify the electron-lattice coupling. We present a microstructural study of the lattice effects in $SrRuO_3$ and $La_{0.67}Sr_{0.33}MnO_3$ thin films grown under different tensile and compressive stresses. Due to the symmetry constraints, the "pseudocubic" perovskite unit cell does not reveal the diversity of distortions and tilts of $BO_6$ octahedra which play a significant role in magnetic and electronic properties of the $ABO_3$ perovskites. We show that the lattice distortions in perovskite thin films under misfit stress can be quantitatively described by assuming a lower symmetry unit cell: tetragonal, orthorhombic or monoclinic. The results demonstrate that the misfit strain modifies the degree and direction of $BO_6$ octahedra distortions and rotations via structural transitions between tetragonal and orthorhombic unit cells as well as lattice modulations. The coherently strained films exhibit stress relief mechanism that is highly anisotropic along perpendicular in-plane directions. Such anisotropic stress accommodation is believed to affect anisotropic magnetic or electronic properties.

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Date submitted: 18 Nov 2009 Electronic form version 1.4