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**Coherent Long Range Lateral Charge Ordering in strained Epitaxial Oxide Film Structures.** JONG-WOO KIM, PHILIP RYAN, Ames Laboratory, JAK CHAKHALIAN, MIKHAIL KAREEV, JIAN LIU, University of Arkansas, STEVE MAY, ANAND BHATTACHARYA, JOHN FREELAND, Argonne National Laboratory, AMES LABORATORY TEAM, ARGONNE NATIONAL LABORATORY COLLABORATION, UNIVERSITY OF ARKANSAS COLLABORATION — The quality of ordered oxide films has reached the level whereby epitaxial superlattice structures can now be achieved by both pulsed laser deposition (PLD) and ozone assisted molecular beam epitaxial (MBE) growth. Engineering each layer coupled with compressive and tensile strain with the explicit aim of controlling and or enhancing the macroscopic electrical and magnetic ordering is a considered aim of ordered oxide film growth. The question how highly strained films structurally respond to such stress is examined by synchrotron diffraction. Both LaSrMnO films grown on STO(001) by MBE and PLD grown LaNiAlO films on both LAO(001) and STO(001) have revealed coherent lateral ordering dependent upon film disorder, substrate mismatch induced strain and even dislocations induced by the substrate step morphology.

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