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Effects of epitaxial strain on oxygen vacancy ordering in LaCoO3 films[1] NEVEN BISKUP[2], U. Complutense Madrid, Spain, VIRAT MEHTA, U. of California Berkeley, USA, STEVEN PENNYCOOK, Oak Ridge national Laboratory, YURI SUZUKI, U. of California Berkeley, USA, MARIA VARELA[3], Oak Ridge national Laboratory, ORNL COLLABORATION, UCB COLLABORATION, UCM COLLABORATION — We report on atomically-resolved Z-contrast imaging and electron-energy-loss spectroscopy of epitaxial LaCoO3 thin films grown on SrTiO3, LaAlO3 and (LaAlO3)(SrTaO3) substrates. Regardless of the sign and magnitude of the epitaxial strain imposed by substrate, the LaCoO3 thin films contain oxygen vacancies to varying degrees. These oxygen vacancies tend to order parallel to the film/substrate interface in LCO films under tensile strain and perpendicular under compressive strain. Oxygen vacancy ordering results in charge ordering (CO) among the Co ions as observed by EELS through analysis of the Co L2,3 intensity ratio. We will discuss the amount of oxygen vacancies, the resulting superstructures and CO in the context of the ferromagnetismobserved in these films.

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