

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

TEM imaging and in-situ EELS study of multiple ferroic transitions in LaCoO₃¹ TIAN TIAN YUAN, ROBERT KLIE, University of Illinois at Chicago, Department of Physics, NINA ORLOVSKAYA, University of Central Florida — The perovskite oxide LaCoO₃ has attracted increasing attention due to its reported room-temperature ferroelastic behavior, and a ferromagnetic transition observed at around 90K in epitaxially strained thin films. To advance our understanding of these nanoscale properties of LaCoO₃, a combination of analytical TEM techniques, including the atomic-resolution Z-contrast imaging and electron energy-loss spectroscopy in combination with in-situ cooling experiments have been used to study the relationship of the multiple ferroic transitions in bulk LaCoO₃. In particular, we find that the bulk LaCoO₃ samples compressed above the coercive stress exhibit ferromagnetic transitions, similar to the ferromagnetic behavior of the epitaxially strained LaCoO₃ thin film. While the bulk LaCoO₃ samples compressed below the coercive stress do not exhibit any ferromagnetic transitions down to 5K. We will further correlate this ferromagnetic property to the ferroelastic property of LaCoO₃, and show how the strain of the LaCoO₃ affects the ferromagnetic property of the sample.

¹Funded by: NSF CAREER Award DMR-0846748

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Date submitted: 18 Nov 2010

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