

Abstract Submitted
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Anomalous Short Range Charge Ordering in $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$ JING TAO, Brookhaven National Lab, S.J. PENNYCOOK, Oak Ridge National Lab, Y. ZHU, Brookhaven National Lab — Long range charge ordered (CO) phases have been observed at low temperatures in manganites in certain doping ranges. Structural characterization of the long-range CO phase showed that the CO superlattice is always along the Pnma a axis in bulk samples [1]. Here we report the observations of a short range CO phase in $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$ samples as a function of cation concentration x , temperature and magnetic field using in-situ electron microscopy. We find short range CO nanoclusters with the CO superlattice in both perpendicular directions (a and c axes) in single crystal domains. The a and c axis nanoclusters have different densities, and show different dependences on temperature and magnetic field. Time evolution of the CO nanoclusters with the CO superstructure along the anomalous direction (c axis) is also recorded, which implies that the energy barrier between the two types of the CO structure is very small [2]. [1]. P. G. Radaelli *et al.*, PRB 59, 14440 (1999) [2]. Research sponsored by the Office of Basic Energy Sciences, Division of Materials Sciences and Engineering and by appointment to the ORNL Postdoctoral Research Program administered jointly by ORNL and ORISE. Work at BNL was supported by the U.S. DOE/BES under Contract No. DE-AC02-98CH10886.

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