

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Ferromagnetically **charge**
ordered nanoclusters in $\text{La}_{0.52}\text{Ca}_{0.48}\text{MnO}_3$ ¹ JING TAO, Brookhaven National
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A charge-ordered (CO) nanoscale phase was reported to appear in coincidence with
the well known colossal magnetoresistance (CMR) in a wide doping range in man-
ganites. The competition between the CO nanoscale phase and the surrounding
ferromagnetic (FM) phase has been considered as the key to understand the CMR
phenomenon. However, the role of this nanoscale phase in the CMR effect is not
fully established because the magnetic and physical properties of the CO nanoscale
phase remain elusive. In particular, the CO nanoscale phase was hypothesized to
be antiferromagnetic, the same as its long range counterpart. Here we report the
experimental evidences showing the unexpected magnetism and resistivity in the
CO nanoclusters in $\text{La}_{0.52}\text{Ca}_{0.48}\text{MnO}_3$. Correlated with a number of bulk property
measurements, the transmission electron microscopic observations strongly suggest
that the CO nanoclusters are FM and probably conducting. Such results could
substantially alter the role of the CO nanoclusters in the CMR.

¹Research at BNL was sponsored by the U.S. DOE/BES under Contract No. DE-
AC02-98CH10886.

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Date submitted: 19 Nov 2010

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