

MAR08-2007-002633

Abstract for an Invited Paper
for the MAR08 Meeting of
the American Physical Society

Sliding charge density wave in manganites

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Stripe and checkerboard phases appear in many metal oxide compounds, and are thought to be linked to exotic behaviour such as high temperature superconductivity and colossal magnetoresistance. It is therefore extremely important to understand the fundamental nature of such phases. The so-called stripe phase of the manganites has long been interpreted as the localisation of charge at atomic sites. Here, we present resistance measurements on $\text{La}_{0.50}\text{Ca}_{0.50}\text{MnO}_3$ which strongly suggest that this state is in fact a prototypical charge density wave (CDW) which undergoes collective transport. Dramatic resistance hysteresis effects and broadband noise properties are observed, both of which are typical of sliding CDW systems. Moreover, the high levels of disorder typical of manganites result in behaviour similar to that of well-known disordered CDW materials. The CDW-type behaviour of the manganite superstructure suggests that unusual transport and structural properties do not require exotic physics, but could emerge when a well-understood phase (the CDW) coexists with disorder.