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Monte Carlo study of the one-orbital model for manganites in the CMR regime RONG YU, Department of Physics, University of Tennessee, CENGIZ SEN, GONZALO ALVAREZ, ORNL, ELBIO DAGOTTO, Department of Physics, University of Tennessee and Condensed Matter Sciences Division, ORNL — The thermal phase transition in the one-orbital model for manganites with cooperative phonons and superexchange coupling is studied using Monte Carlo simulations. In the absence of on-site disorder, the model has a second order phase transition from a paramagnetic insulating phase to a ferromagnetic metallic phase in the CMR regime. The CMR effect is found to be associated with short-range charge and spin correlations in the insulating phase. This clearly shows that the CMR effect arises from the competition between the ferromagnetic and a charge-ordered competing states. Motivated by a recent STM experiment, we also studied the local density of states in this one-orbital model. We show how the experimental results can be understood within our model.

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