Abstract Submitted
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CMR effect observed in Monte Carlo simulations of double-exchange models with Jahn-Teller lattice distortions CENGIZ SEN, University of Tennessee, Knoxville and Oak Ridge National Lab, GONZALO ALVAREZ, Oak Ridge National Lab, ELBIO DAGOTTO, University of Tennessee, Knoxville and Oak Ridge National Lab — The two e_g-orbital model, including Jahn-Teller lattice distortions and the superexchange interaction, is studied using unbiased exact diagonalization Monte Carlo techniques at a doping value $x = 0.25$. A canonical colossal magnetoresistance (CMR) resistivity vs. temperature shape is obtained with a resistivity peak of nearly two orders of magnitude. We investigate the Monte Carlo evolution and temperature dependence of the spin, lattice, and orbital degrees of freedom in order to further understand the origin of the CMR effect. Results including quenched disorder, which seems to play an important role in stabilizing the competing phases, will also be discussed, and a comparison with recent nano-scale transmission electron microscopy experiments will be made [1]. This very CPU-time demanding effort, which was made possible due to the use of the ORNL computer facilities, generalizes the previous study to two orbitals where the CMR effect was observed in a one-orbital model [2].

[1]. J. Tao *et al.*, Phys. Rev. Lett. 103, 097202 (2009).
[2]. C. S. *et al.*, Phys. Rev. Lett. 98, 127202 (2007), R. Yu *et al.*, Phys. Rev. B 77, 214434 (2008).

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