

Abstract Submitted
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Striped Multiferroic Phases in Narrow Bandwidth Hole-Doped Manganites¹ SHUHUA LIANG, Univ. of Tennessee, ORNL, SHUAI DONG, Southeast University, China, CENGIZ SEN, UTK, ORNL, MARIA DAGHOFER, IFW Dresden, ELBIO DAGOTTO, UTK, ORNL — A novel phase with diagonal charge stripes and a complex spin arrangement that allows for ferroelectricity to develop has been recently reported in a model for hole-quarter-doped manganites (S. Dong et al., Phys. Rev. Lett. **103**, 107204 (2009)). The study of this “spin-orthogonal stripe” (SOS) phase is here generalized to other hole doping fractions $x = 1/N$ ($N = 3, 5, 6, \dots$), to search for analogous multiferroic states. In this effort, the two-orbital double-exchange model for manganites is studied, employing variational, Monte Carlo, and zero temperature optimization techniques. The phase diagrams obtained by varying the electron-lattice and superexchange couplings also contains exotic C_xE_{1-x} phases. A systematic procedure to construct new C_xE_{1-x}/SOS_x phases is discussed. Both the Dzyaloshinskii-Moriya interaction and exchange-striction effect may work in these C_xE_{1-x}/SOS_x phases, giving rise to ferroelectricity. In addition, these SOS_x/C_xE_{1-x} phases can be extended into many other similar states, with (almost) degenerate energies but different multiferroic properties.

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