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Novel Striped Multiferroic Phases in Hole-Doped Manganites SHUHUA LIANG, University of Tennessee, Oak Ridge National Laboratory, SHUAI DONG, Nanjing University, ELBIO DAGOTTO, University of Tennessee, Oak Ridge National Laboratory — After the discovery of a so-called "spin-orthogonal stripe" (SOS) phase in models for quarter-doped hole manganites [1], our group carried out additional computational work at other doping fractions to search for analogous multiferroic phases. Here we report the discovery of similar SOS phases at several hole dopings $x = 1/N$ ($N = 3, 5, 6...$) using a double exchange model with spin frustration, and applying variational and Monte Carlo techniques. The full phase diagram created by varying electron-lattice and superexchange couplings also contains an exotic C_xE_{1-x} phase. The new SOS_x phases are intuitively explained via a rotation from the C_xE_{1-x} zig-zag spin configuration. This creates stripes separating domains containing orthogonal spins. Because of the Dzyaloshinskii-Moriya interaction, it is conjectured that these SOS states should be ferroelectric as well. For N even the spin states are similar to N odd but there is a cancellation of the net ferroelectric moment.

[1] Shuai Dong *et al.*, Phys. Rev. Lett. **103**, 107204 (2009).

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