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Magnetic switching and phase competition in the multiferroic antiferromagnet $\mathbf{Mn_{1-x}Fe_xWO_4}$[1] FENG YE, Oak Ridge National Laboratory, Y. REN, Argonne National Laboratory, J.A. FERNANDEZ-BACA, H.A. MOOK, Oak Ridge National Laboratory, J.W. LYNN, NIST Center for Neutron Research, R.P. CHAUDHURY, Y.-Q. WANG, B. LORENZ, C.W. CHU, University of Houston — Elastic neutron scattering is used to study the spin correlations in the multiferroic $Mn_{1-x}Fe_xWO_4$ with x=0.035, 0.05, and 0.10. The noncollinear incommensurate (ICM) magnetic structure associated with the ferroelectric (FE) phase in pure MnWO4 is suppressed at x=0.035 and completely absent at x=0.10. The ICM spin order and FE phase can be restored by applying a magnetic field along the spin easy axis. The low-T commensurate magnetic structure extends in both H/T with increasing Fe concentration. The systematic evolution of the magnetic and electric properties indicates that the noncollinear ICM spin order results from competing magnetic interactions and its stabilization can be tuned by the internal (x) or external magnetic-field perturbations.

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