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$Mn_{1-x}Co_xWO_4$: From x = 0.05 to x = 0.17- a study of the multiferroic state under high pressure MELISSA GOOCH, NARAYAN POUDEL, BERND LORENZ, KAO-CHEN LIANG, Texas Center for Superconductivity and Department of Physics at the University of Houston, YAQI WANG, Y. Y. SUN, Retired, JINCHEN WANG, FENG YE, Quantum Condensed Matter Division, Oak Ridge National Laboratory, JAIME FERNANDEZ-BACA, Quantum Condensed Matter Division, Oak Ridge National Laboratory and Department of Physics and Astronomy at the University of Tennessee, CHING-WU CHU, Texas Center for Superconductivity and Department of Physics at the University of Houston and Lawrence Berkeley National Laboratory — It is well understood for multiferroic materials that small perturbations from chemical substitution, magnetic and electric fields, or external pressure can result in new states with different magnetic orders and ferroelectric properties. One such system is $Mn_{1-x}Co_xWO_4$, which has an interesting and complex phase diagrams where two multiferroic phase coexist at x = 0.15. At this boundary on the phase diagram the conical spin extends to lower temperature, in addition to the a-c spiral spin structure forming below 7 K. On either side of the boundary we have a spiral spin structure for $x < 0.15$ and a conical spin for $x > 0.15$. To gain further insight into this system, high pressure polarization and dielectric measurements up to 18 kbars, as well as high pressure neutron experiments were conducted. The effect of external pressure on the $Mn_{1-x}Co_xWO_4$ system can be described as similar to Co doping. Suggesting we have a polarization flop, where the a-c spiral is stabilized into the conical spin leading to the increased polarization that is observed for the x = 0.135.

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