

Abstract Submitted
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Tuning magnetic interaction in orthorhombic Neodymium-Yttrium Manganites $\text{Nd}_{1-x}\text{Y}_x\text{MnO}_3$ SVEN LANDSGESELL, DIMITRI ARGYRIOU, NADIR ALIOUANE, Hahn-Meitner-Institut — By lowering the Mn-O-Mn bond angle in LnMnO_3 with $\text{Ln}=\text{La-Ho}$ the Neel-temperature decreases and at $\text{Ln}=\text{Tb}$ the A-type antiferromagnet transforms to an incommensurate (IC) spin-spiral phase for $\text{Ln}=\text{Gd,Tb,Dy}$. The spin-spiral breaks both inversion and time reversal symmetry leading to a strong coupling between magnetism and ferroelectric polarization. We investigate the evolution of the crystal and magnetic structure from the A-type phase to the IC spin spiral phase by systematically replacing neodymium by yttrium in NdMnO_3 resulting to a decrease of the tolerance factors to values similar to that for multiferroic TbMnO_3 . One advantage of this approach is that the tolerance factor can be tuned and that neodymium and yttrium are not high neutron absorbing elements in sharp contrast to other rare earths like Gd, Dy and Eu. Compositions $x=0.0$ to 0.6 have been prepared, neutron and x-ray powder diffraction patterns were measured as well as the magnetic properties. It can be shown that by decreasing the tolerance factor that way, similar effects can be seen as with varying the ionic size of the rare earth ions. For example we found that between $0.4 < x < 0.6$ the incommensurate phase co-exists with the A-type antiferromagnetic phase and with $x=0.6$ and higher the system is only incommensurate and seemingly multiferroic.

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