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Magnetic domains in multiferroic $YMn2O_5$ probed by Spherical Neutron Polarimetry under electric field CARLO VECCHINI, LAURENT CHAPON, PAOLO RADAELLI, AZIZ DAOUD-ALADINE, ISIS Facility, Rutherford Appleton Laboratory, Chilton, Didcot, Oxfordshire, OX11 0QX, UK, JANE BROWN, TAPAN CHATTERJI, Institut Laue-Langevin, 6, rue Jules Horowitz, BP156-38042 Grenoble Cedex 9 - France, SOONYONG PARK, SANG-WOOK CHEONG, Department of Physics and Astronomy, Rutgers University, Piscataway, New Jersey 08854, USA — Precise determination of the magnetic structures in multiferroics RMn_2O_5 (R: Y, Ho, Bi) have been obtained by single crystal neutron diffraction. The analysis shows the presence of zig-zag antiferromagnetic chains in the ab-plane. An additional weak magnetic component parallel to the c-axis was detected which is modulated in phase quadrature with the a-b components. The nature and population of the coexisting antiferromagnetic domains in YMn_2O_5 have been determined by Spherical Neutron Polarimetry under an external electric field. We have proved that reversing the electrical polarity results in the inversion of the population of two types of antiferromagnetic domains, with opposite in-plane spin components. This analysis strongly supports theories in which the coupling of the magnetic configuration to the ferroelectric polarisation is due to magnetic exchange striction and likely not related to the small cycloidal modulation in the bc-plane.

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