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Spin structures of magnetic phases in magnetic ferroelectrics, RMn2O5(R = Y and Tb) J.H. KIM, S.-H. LEE, Department of Physics, University of Virginia, J-H. CHUNG, NIST Center for Neutron Research and Univ. of Maryland, M. KENZELMANN, ETH/PSI, J. SCHEFER, PSI, C.F. MAJKRZAK, NIST, S. PARK, S-W. CHEONG, Rutgers University — We report polarized and unpolarized neutron diffraction data obtained from single crystals of magnetic ferroelectrics, RMn2O5(R=Y and Tb). Each system undergoes, upon cooling, more than one magnetic and ferroelectric phase transitions. By using the group representation theory and fitting the data, we have determined the spin structures of the different phases to elucidate the microscopic mechanism of the static spin-charge coupling in the multiferroics. Our results show that the magnetic and ferroelectric phases of the two systems have spin structures that can only be constructed by a linear combination of the basis functions of two two-dimensional representations of the magnetic space group. Implication of the spin structures to the electric polarization of the systems and to theoretical models will also be discussed.

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