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Magnetism-Driven Ferroelectricity in $GdMn_2O_5$ NARA LEE, Rutgers University, YOUNG JAI CHOI, Yonsei University, C. VECCHINI, Diamond Light Source Ltd, L. C. CHAPON, ISIS Facility, Rutherford Appleton Laboratory , P. G. RADAELLI, Oxford Physics, A. BOMBARDI, Diamond Light Source Ltd, S-W. CHEONG, Rutgers University — $REMn_2O_5$(RE=rare-earth) is one of the well-studied multiferroics which exhibits the reversible switching of ferroelectric polarization under the application of external magnetic fields. It is known that the ferroelectricity in REMn2O5 originates from the symmetric exchange interaction between Mn ions. However, the role of the rare-earth elements has never been elucidated. In order to reveal the full magnetic structure and the contribution of rare-earth magnetism to the ferroelectricity, we have studied the detailed magnetic and structural properties of high-quality single-crystalline $GdMn_2O_5$ (space group, Pbam). We have performed the resonant x-ray $scMn_2O_5$attering experiment, and comprehensive measurements of physical properties of the system, including magnetic susceptibility, dielectric constant and ferroelectric polarization with the variation of temperature and magnetic fields.

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