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X-ray diffraction and reciprocal space mapping in $ZnMnGaO_4$ films with checkerboard nanostructures A.A. SIRENKO, S.M. O'MALLEY, P.L. BONANNO, Department of Physics, New Jersey Institute of Technology, Newark, New Jersey 07102, A. KAZIMIROV, Cornell High Energy Synchrotron Source (CHESS), Cornell University, Ithaca, New York 14853, S. PARK, S.-W. CHEONG, Rutgers Center for Emergent Materials and Department of Physics & Astronomy, Rutgers University, Piscataway, New Jersey 08854 — Reciprocal space maps (RSM) in $ZnMnGaO_4$ films with checkerboard nanostructures were measured with the energy of the x-ray beam of 10.53 keV at the A2 beamline at Cornell High Energy Synchrotron Source (CHESS) using a four-circle diffractometer. Structural properties of the checkerboards, such as elastic strain, relaxation effects, twists, and tilts of the nanodomains, were analyzed using H-K, H-L, and K-L cross sections of the RSM's measured around various symmetric and asymmetric reflections (022), (004), (044), (226), (222) of the spinel structure. Work at Rutgers was supported by the DE-FG02-07ER46382 and the NSF-DMR- 0706326. Work at NJIT was supported by the NSF-DMR-0546985. The Cornell High Energy Synchrotron Source is supported by the NSF and the NIH/NIGMS under Award No. DMR-0225180.

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