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Magnetic structures in potential multiferroic GdCrO₃ PASCAL MANUEL, ISIS Pulsed Neutron and Muon Facility, LAURENT CHAPON, Institut Laue Langevin, DMITRY KHALYAVIN, ISIS Pulsed Neutron and Muon Facility, WANG XUEYUN, SANG-WOOK CHEONG, Rutgers University — For the past decade, multiferroics materials have attracted a lot of attention in the condensed matter community because of potential applications for devices. A somewhat ambiguous addition to the multiferroics family was recently reported in the perovskite based GdCrO₃ in both bulk and thin film samples. Indeed, ferroelectricity was evidenced by a strong enhancement of the capacitance in a field but significant leakage and no well developed P-E hysteresis blurred the picture. Our own measurements clearly indicate the existence of a polar phase below 2K. To complete the understanding of this material, the determination of the magnetic structure is required but is hampered by the fact Gd is a strong neutron absorber. We will present some neutron diffraction data collected on an isotopic ¹⁶⁰GdCrO₃ sample at the WISH diffractometer at ISIS which confirm the presence of three successive magnetic phases, previously only seen by magnetization, as a function of temperature. We will compare our determined structures against predictions based on group theoretical considerations and experimental work on other rare-earth ortho-chromates and discuss the mechanism for multiferroicity.

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