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Incommensurate to commensurate transition under magnetic field in $TbMnO_3$ DIMITRI N. ARGYRIOU, Hahn-Meitner-Institut, N. ALIOUANE, S. LANDSGESELL, C.J. MILNE, Hahn-Meitner-Institut, Glienicker Strasse 100, D-14109 (Germany), J. STREMPFER, I. ZEGKINOGLOU, Max Planck Institute for Solid State Research, Heisenbergstrasse 1, D-70569 Stuttgart (Germany), M. VON ZIMMERMANN, HASYLAB, Notkestrasse 85, D-22603 (Germany) — We have studied the evolution of the incommensurate satellite peaks of $TbMnO_3$ by neutron and x-ray single crystal diffraction with field H$\|b$ and H$\|c$. For H$\|b$ and a temperature of T=3K, Tb undergoes the first order phase transition characterized by a change of the magnetic wavevector from q_{Tb} $\sim$0.44 to 0.33 r.l.u. at a field of 1.75T. X-ray diffraction measurements show that the structural counterpart for the magnetic Tb reflection follows a similar dependence with $2q_{Tb}$=0.82 r.l.u. changing to 0.66 r.l.u.. At H=6T and T=3K, the structural superlattice reflections for both the Mn and Tb wavevectors collapse to a single q-commensurate structure with propagation vector Q=[0,1/2,l]. This transition coincides with anomalies in the polarization P$\|c$. For fields of up to 4T applied along the c-direction no new magnetic phases arise, except for the shift of the antiferromagnetism and locking transitions.

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