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Investigation of coupling between antiferromagnetic and ferroelectric orders in $TbMnO_3$ using magnetic field dependent Raman scattering HARINI BARATH, MINJUNG KIM, S.L. COOPER, Dept. of Physics and Frederick Seitz Materials Research Laboratory, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801, I. MAHNS, M. RUEBHAUSEN, Institut fur Angewandte Physik, Univeristat Hamburg, Jungiusstrasse 11, D-20355 Hamburg, Germany, D.N. ARGYRIOU, Hahn-Meitner Institut, Glienicker Str. 100, D-15109 Berlin, Germany — $TbMnO_3$ is an antiferromagnetic insulator with a distorted orthorhombic perovskite structure and a Néel temperature at $T_N = 41$K. $TbMnO_3$ is of particular interest because it is one of the few materials that exhibits not just a co-existence, but a strong coupling between antiferromagnetic and ferroelectric order, as evidenced by a para- to ferro- electric transition below T = 28K. In this talk, we discuss magnetic field dependent Raman scattering measurements of $TbMnO_3$ – both for magnetic fields oriented along various crystallographic directions and as a function of temperature through the ferroelectric and Néel transitions - the goal of which is to investigate the magnetic-ferroelectric coupling mechanism in this interesting material.

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