

Abstract Submitted
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Electromagnon in TbMnO₃ under magnetic field by Raman scattering PAULINE ROVILLAIN, MAXIMILIEN CAZAYOUS, YANN GALLAIS, ALAIN SACUTO, MARIE-AUDE MEASSON, Laboratoire Materiaux et Phenomenes Quantiques - Paris 7, HIDEAKI SAKATA, Department of physics University of Science Tokyo, LABORATOIRE MATERIAUX ET PHENOMENES QUANTIQUES - PARIS 7 TEAM, DEPARTMENT OF PHYSICS UNIVERSITY OF SCIENCE TOKYO COLLABORATION — Magnetolectric excitations in the multiferroic TbMnO₃ have been investigated by Raman spectroscopy. Our observations reveal electromagnons excitations at 30 cm⁻¹ and at 60 cm⁻¹ with electric polarization of light parallel to the a axis [1]. When a magnetic field is applied along the c axis, no flop of the spiral plane or polarization is observed but TbMnO₃ becomes paraelectric and a simple antiferromagnetic phase is developed. We show that the dipole character of the electromagnons disappears whereas their magnon compound appears immediately when the spins spiral is destabilized with a magnetic field along the c axis. The magnon dispersion curve associated with the electromagnons is preserved before the construction of the magnon dispersion of the simple antiferromagnetic phase at higher magnetic field. The effect of the phase transition on the phonon modes shows that the Mn-O distance is the key that controls the polar character of the electromagnons.

[1] P. Rovillain et al., PRB 81, 054428 (2010)

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