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Infrared spectroscopy of phonons and electromagnons in multiferroic TbMnO₃ R.P.S.M. LOBO, R. SCHLECK, LPEM, ESPCI-ParisTech, CNRS, Paris, France, R.L. MOREIRA, Depto. Fisica, UFMG, Brazil, H. SAKATA, Dept. Physics, Tokyo Univ. Science, Japan — We measured the temperature dependent infrared reflectivity spectra of TbMnO₃ with the electric field of light polarized along each of the three crystallographic axes. We analyzed the effect, on the phonon spectra, of the different phase transitions occurring in this material. We show that the antiferromagnetic transition at T_N renormalizes the phonon parameters along the three directions. Our data indicate that the electromagnon, observed along the a direction, has an important contribution in building the dielectric constant. We show that this electromagnon spectral weight comes only from a few phonons which can be clearly identified. We also determined that only one phonon, observed along the c -axis, has anomalies at the ferroelectric transition. This phonon is built mostly from Mn vibrations, suggesting that Mn displacements are closely related to the formation of the ferroelectric order.

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