

Abstract Submitted
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Colossal magnon-phonon coupling in multiferroic $\text{Eu}_{0.75}\text{Y}_{0.25}\text{MnO}_3$ ¹ ROLANDO VALDES AGUILAR, A.B. SUSHKOV, H.D. DREW, MRSEC, University of Maryland. College Park, MD 20742, C. ZHANG, S-W. CHEONG, Rutgers University, Piscataway, NJ 08854 — The temperature dependence of the far infrared (IR) transmission spectra (1-30 meV) of multiferroic $\text{Eu}_{0.75}\text{Y}_{0.25}\text{MnO}_3$ has been measured. This system is chosen to correspond to TbMnO_3 , but without the magnetism of the rare earth ion. We find a spectacular transfer of spectral weight from the lowest frequency IR active phonon to a magnetic excitation, at lower frequencies, when light is polarized parallel to the static polarization \mathbf{P}_a . We also observe the electromagnon at a frequency of 2.5 meV, with the same selection rule. The electromagnon produces the observed increase in the dielectric constant as the system enters the ferroelectric phase. The observations of large spectral weight transfer and of the electromagnon selection rule, are not consistent with the model of the electrodynamic response of helical magnets proposed by Katsura, et al². We compare and contrast these results to other multiferroic manganites.

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²Katsura, et al. CondMat (2006)

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