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Spectral origin of the c-axis dielectric constant anomalies in hexagonal $HoMnO_3$[1] ANDREI SUSHKOV, H. DENNIS DREW, MRSEC, University of Maryland, SANG-WOOK CHEONG, Rutgers University — The coupling between ferroelectric (P) and magnetic (M) order parameters in multiferroics is one of the most important problems both for basic understanding and applications. If this coupling in hexa-manganites occurs within a unit cell there should be a phonon, infrared-active in $E||c$ polarization, which modulates simultaneously P_c and Mn–Mn superexchange in the ab-plane. The dielectric constant anomalies, observed at magnetic ordering/re-ordering temperatures, indicate existence of a spin-coupled phonon(s). To find the linking phonon we have measured temperature dependence of the c-axis infrared phonon spectrum of a hexagonal $HoMnO_3$ single crystal. These optical results and the dielectric anomalies will be discussed in terms of the coupling between the two order parameters in the multiferroic hexa-manganites.

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