

Abstract Submitted  
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**Magnetoelectric orthorhombic and multiferroic hexagonal ErMnO<sub>3</sub>: THz hybrid modes in RMnO<sub>3</sub>(R)= Nd, Er, Tm)** N.E. MASSA, LANAIS EFO-CEQUINOR, UNLP, La Plata, Argentina, V. TA PHUOC, GREMAN, Tours, France, L. DEL CAMPO, D. DE SOUSA MENESES, P. ECHEGUT, CNRS-CEMHTI, Orléans, France, K. HOLLACK, HZB, BESSY II, Berlin, Germany, M.J. MARTÍNEZ-LOPE, J.A. ALONSO, ICMM-CSIC, Madrid, Spain — We report on far- and mid-infrared emission, reflection, and transmission spectra of metastable orthorhombic perovskite (Pbnm- $T_N \sim 42$  K) and hexagonal (P6<sub>3</sub>cm- $T_N \sim 84$  K) ErMnO<sub>3</sub>. The number of phonon modes remains constant from 300 K to 4 K. Magnetically disordered electrons in fluctuating orbitals lead to an ambient THz broad reflectivity band. On cooling toward  $T_N$  the electrons exhibit increasing charge and magnetic short-range correlations and condense into soft bands that harden at about  $T_N$  as magnetic order sets in. However, at difference of NdMnO<sub>3</sub> and TmMnO<sub>3</sub> that show correlation with a gap opening in transverse acoustical phonon dispersion and spin order, hexagonal ErMnO<sub>3</sub> develops at 5 K a set of four strong hybridized modes centered  $\sim 70$  cm<sup>-1</sup> in addition to one peaking at  $\sim 96$  cm<sup>-1</sup> and another weaker at  $\sim 44$  cm<sup>-1</sup>. Orthorhombic ErMnO<sub>3</sub> develops a 46 cm<sup>-1</sup> band and a very strong one at 91cm<sup>-1</sup> that seems to correlate to a weaker 98 cm<sup>-1</sup> phonon in the short-range only magnetic order environment. We conclude that Er<sup>3+</sup> paramagnetic fluctuations increases Mn spins frustration in both compounds being the disruption strongest in orthorhombic ErMnO<sub>3</sub> where the THz band and short range magnetic onset may be traced even at 150 K, probably, due to the increment in the Jahn-Teller distortion.

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