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**Collective Phase Mode and the Role of lattice distortions at $\mathbf{T_N \sim T_C}$ in $\mathbf{XMn_2O_5}$ (X= Bi, Pr, Sm, Gd, Tb)** N.E. MASSA, LANAIS EFO-CEQUINOR, UNLP, La Plata, Argentina, A.F. GARCÍA FLORES, E. GRANADO, IFGW, UNICAMP, Campinas, Brazil, G.F.L. FABBRIS, G. DE M. AZEVEDO, LNLS, Campinas, Brazil, L. DEL CAMPO, D. DE SOUSA MENESES, P. ECHEGUT, CNRS-CEMHTI, Orleans, France , M.J. MARTÍNEZ-LOPE, J.A. ALONSO, ICMM-CSIC, Madrid, Spain — We report on detailed temperature dependent infrared reflectivity, Raman, local structure, and X-ray diffraction measurements of multiferroic $XMn_2O_5$ (X= Bi, Pr, Sm, Gd, Tb). While for $BiMn_2O_5$ there are weak but distinct spectroscopic changes that together with high resolution diffraction patterns suggest a lattice role at $T_N \sim T_C$, for the rare earth (R) replaced infrared spectra have as a main feature a broad band at meV energies in addition to progressive rotation of Mn-O polyhedra. That band, independent of the $R^{3+}$ ion size and common to all, suggests hopping of carriers through fluctuations at a local scale. It partially condenses below 40 K, i.e., the collective electronic behavior changes from delocalized to one partially localized. We assimilate that condensate to a CDW-like phase mode. It might indicate induced orbital correlation of charge transfers between Mn sites.Frequency Raman phonon shifts are observed at T$\sim$60 K, due to spin-phonon coupling, and at $T_N \sim T_C$. Below $T_N \sim T_C$ there is no a Raman soft mode that might be associated to a CDW amplitude mode.

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