Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Antiferromagnetic pinning of a phase-like mode below T_N in $NdMnO_3$ NESTOR MASSA, LANAIS EFO-CEQUINOR, UNLP, La Plata, Argentina, LEIRE DEL CAMPO, DOMINGOS DE SOUSA MENESES, PATRICK ECHEGUT, CNRS-CEMHTI, Orléans, France, MARIA JESUS MARTÍNEZ-LOPE, JOSE ANTONIO ALONSO, ICMM-CSIC, Madrid, Spain — We report on reflectivity and emission far infrared spectra of $NdMnO_3$between4K and its dissociation temperature. Phonon bands at 300K are in agreement with orthorhombic Pbnm space group assignments. In addition, a broad strong band. reminiscent to a phase-mode in quasi-one dimension metals, is found at very low frequencies that it is understood originating in charge fluctuations in d-orbitals. There is no distinctive behaviors between 1073 K and 1173 K, where orthorhombic O and O' coexist. Beyond ∼700 K a mid-infrared polaron band turns into a Drude tail suggesting hopping conductivity double exchange due to air heating oxidation $Mn^{3+} \rightarrow Mn^{4+}+1e^{-}$. Below 300 K phonons are better defined and the low frequency giant dipole acquires strength. Few degrees above the antiferromagnetic transition it broadens as electrons loosing coherence. At T_N ∼76 K we find strong phonon magnetostriction while the band turns asymmetric locking-in to the underlying magnetic order. Preliminary measurements of hexagonal $TmMnO_3$, show that asymmetry split due to lower symmetry and the triangular magnetic lattice two exchange integrals J_1 and J_2 in the a-b plane. Similar to a soft mode those two bands and a lower frequency resonance undergo strong hardening down to 4 K.

Nestor Massa
LANAIS EFO-CEQUINOR, UNLP, La Plata, Argentina

Date submitted: 04 Nov 2011 Electronic form version 1.4