On the Nature of the Ferroelectric Transition in Multiferroic Hexagonal REMnO$_3$ TREVOR TYSON, TAO WU, HAIYAN CHEN, NJIT, JAINMING BAI, University of Tennessee, SANG-WOOK CHEONG, Rutgers University — Combined local and long range structural measurements were conducted on REMnO$_3$ for temperatures extending significantly above the ferroelectric transition temperature ($T_{FE}$). We find in hexagonal REMnO3 no large atomic (bond distance or thermal factors) or electronic structure changes on crossing $T_{FE}$. The born effective charge tensor is found to be highly anisotropic at the O sites indicating very strong hybridization of the charge. The tensor does not change significantly above $T_{FE}$ revealing no charge redistribution and suggests an unusual transition. This work is supported by DOE Grants DE-FG02-07ER46402 (NJIT) and DE-FG02-07ER46382 (Rutgers University).