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Time resolved terahertz and second harmonic investigations in multiferroic $R\mathbf{MnO_3}$ and $R\mathbf{Mn_2O_5}$ ROLANDO VALDES AGUILAR, Y-M. SHEU, A. TAYLOR, R.P. PRASANKUMAR, D. YAROTSKI, Center for Integrated Nanotechnologies, Los Alamos National Laboratory, NM 87545, E. ABREU, J. ZHANG, R. AVERITT, Physics Department, Boston University, Boston, MA 02215, S-W. CHEONG, Department of Physics & Astronomy, Rutgers University, Piscataway NJ 08854 — The dynamical aspects of magnetoelectric interactions has been a very active area of research in multiferroic materials. Through linear far infrared and terahertz spectroscopies it has been shown that electric dipolo active excitations, called electromagnons, exist in some multiferroic materials and complex magnets. An unexplored area of investigation has been the non-linear response of these excitations to strong electromagnetic fields. We investigate the time resolved response of electromagnons in multiferroic materials using high-electric-field terahertz spectroscopy and second harmonic generation at infrared frequencies. We will report results on the well characterized multiferroics $TbMnO_3$, $TbMn_2O_5$ and YMn_2O_5.

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