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Dynamics of the Ho^{+3} magnetism in the multiferroic compound $HoMnO_3$ investigated via time domain terahertz spectroscopy N.P. ARMITAGE, N.J. LAURITA, Johns Hopkins University, RONGWEI HU, S-W CHEONG, Rutgers University — The multiferroic insulator $HoMnO_3$ possesses a diverse array of magnetism due to both magnetically active Mn^{+3} and Ho^{+3} moments, the latter of which sit at two distinct sites within its non-inversion symmetric hexagonal crystal structure. While previous studies have focused on the ordering of the Mn^{+3} moments, little is known about the magnetic structure below 5K where it is believed that there is at least partial ordering of the Ho^{+3} ions. In principle, magnetic exchange interactions exist between both distinct Ho^{+3} and Mn^{+3} ions, resulting in an complex phase diagram with as many as five distinct phases found below T = 5K and H = 3T. While previous infrared studies have focused on the Ho^{+3} crystal field levels, the spin excitations in the low frequency end of the far infrared remain unknown. We report the finding of new infrared absorptions via time domain terahertz spectroscopy which we attribute to the Ho^{+3} moments. The corresponding field dependence is studied.

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