

Abstract Submitted  
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**Ultrafast pump-probe spectroscopy of multiferroic TbMnO<sub>3</sub>**  
JINGBO QI, LI YAN, STUART TRUGMAN, JIANXIN ZHU, ALEXANDER BAL-  
ATSKY, QUANXI JIA, ANTOINETTE TAYLOR, ROHIT PRASANKUMAR, Los  
Alamos National Laboratory, CENTER FOR INTEGRATED NANOTECHNOLO-  
GIES TEAM — TbMnO<sub>3</sub>, exhibiting simultaneously both magnetic and ferroelectric  
phases, is an excellent multiferroic candidate for demonstrating the strong coupling  
between different degrees of freedom, i.e. spin, orbital and charge order. Previously,  
ultrafast optical pump-probe spectroscopy has proven to be an ideal technique for  
unraveling the interplay between different orders in the time domain. In this work,  
we used this technique to study ultrafast dynamics in multiferroic TbMnO<sub>3</sub>. At low  
temperatures, we initially observed an extraordinarily slow rising process, with a  
timescale of tens of picoseconds, followed by another decay process with a relaxation  
time of hundreds of picoseconds. An analysis of these two processes as a function of  
temperature reveals the influence of the magnetic and ferroelectric phase transitions  
on carrier dynamics in TbMnO<sub>3</sub>, which agrees well with other experimental results.

Jingbo Qi  
Los Alamos National Laboratory

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