Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Carrier dynamics in $EuTiO_3$ films probed by femtosecond pump-probe spectroscopy[1] ZHONGGUO LI, Harbin Institute of Technology, RUN ZHAO, WEIWEI LI, Soochow University, HAIYAN WANG, Texas A&M University, HAO YANG, Soochow University, XUERU ZHANG, YUXIAO WANG, TAI-HUEI WEI, YING-LIN SONG, Harbin Institute of Technology — Recently, perovskite oxide $EuTiO_3$ has attracted considerable attention due to its intriguing multiferroic properties. To gain a deeper understanding of its fascinating properties, it is essential to characterize the competing interactions between charge, lattice, spin, and orbital parameters. Here we present optical studies of the ultrafast carrier dynamics in $EuTiO_3$ films grown on $SrTiO_3$ substrates by probing photo-induced transient absorption (TA) in the weak excitation limit. All the signals were measured at room temperature. The transient curve of $EuTiO_3$ exhibits a fast rise after photo excitation (approximately 2 ps) and a long decay component with time constant of several nanoseconds, which are attributed to carrier-phonon coupling and carrier recombination respectively. The absorption change of $EuTiO_3$ near zero temporal delay is found to be quite different from the $SrTiO_3$ substrates, implying carrier-phonon interactions differ distinctively between these two materials. Our results could be helpful to understand the microscopic interactions in perovskite oxide.

[1]The authors acknowledge the support of the National Natural Science Foundation of China.

Zhongguo Li
Harbin Institute of Technology

Date submitted: 12 Nov 2014 Electronic form version 1.4