

Abstract Submitted  
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**High Peak Field THz Pump-THz Probe Spectroscopy in Two Dimensional Electron Gas Systems**<sup>1</sup> A. G. LINN, B. BARMAN, University of Alabama at Birmingham, S. A. MCGILL, National High Magnetic Field Laboratory, D. KARAIKAI, University of South Florida, J. L. RENO, Sandia National Laboratory, D. J. HILTON, University of Alabama at Birmingham — We used the technique of THz pump-THz probe spectroscopy to study carrier dynamics in Two Dimensional Electron Gas (2-DEG) systems. **(1)** Single cycle THz pulses were generated via femtosecond laser pump pulse-front tilting for optical rectification in a LiNbO<sub>3</sub> crystal. **(2)** Contrary to optical excitation, THz excitation only results in intra-band transitions, eliminating direct generation of electrons and holes, leading to an increase in the carrier scattering rate. Using this method, we investigated free carrier absorption as well as relaxation of excited carriers back into the  $\Gamma$  valley in GaAs 2-DEG samples of varying well widths. **(1)** Matthias C. Hoffmann et al., J. Opt. Soc. Am. B 26 (9), A29 (2009). **(2)** H. Hirori et al., Applied Physics Letters 98 (9), 091106 (2011).

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