

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

A Study of Two Dimensional Electron Gas Using 2D Fourier Transform Spectroscopy¹ CARL MCINTYRE, Colorado Mesa University, JAGANNATH PAUL, DENIS KARAIKAI, University of South Florida — The dephasing of FES was measured in a symmetrically modulation doped 12 nm single quantum well GaAs/AlGaAs two dimensional electron gas system using time integrated four wave mixing (TIFWM) and a two dimensional Fourier transform spectroscopy (2DFTS). At high in-well carrier densities of $\sim 4 \times 10^{11} \text{ cm}^{-2}$, many body effects that are prevalent and measurable with non-linear optical spectroscopy. Effects of exciton-exciton and exciton-phonon scattering events, exciton populations, and biexciton formation are detectable at these carrier concentrations. Homogeneous linewidths obtained from 2DFT and TIFWM yield a zero Kelvin linewidth of 1.42 meV and an acoustic phonon scattering coefficient of $158 \mu \text{ eV/K}$. These observations indicate a rapid increase in homogeneous linewidth with increased temperature.

¹NSF REU grant # DMR-1263066: REU Site in Applied Physics at USF

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Date submitted: 14 Nov 2014

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