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Magnetic Field and Temperature Dependence of Decoherence in a High Mobility Landau Quantized 2DEG JEREMY CURTIS, Department of Physics, University of Alabama at Birmingham, T.T. TOKUMOTO, National High Magnetic Field Laboratory and Department of Physics, University of Alabama at Birmingham, J.G. CHERIAN, Department of Physics, Florida State University, X. WANG, Department of Electrical Engineering, Rice University, LUKE MCCLINTOCK, Department of Physics, University of Alabama at Birmingham, J.L. RENO, Sandia National Laboratories, A. BELYANIN, Department of Physics, Texas A&M University, J. KONO, Department of Electrical Engineering, Rice University, S.A. MCGILL, National High Magnetic Field Laboratory, D.J. HILTON, Department of Physics, University of Alabama — We apply a perpendicular magnetic field to a high mobility ($\mu = 3.4 \times 10^6$ cm^2 V^{-1} s^{-1}) two dimensional electron gas (2DEG) which splits the Fermi surface into a spectrum of Landau levels (LL). The highest filled and lowest unfilled LLs are coherently coupled by an incident THz pulse. The time required for carriers in this superposition state to become out of phase is the decoherence time. The focus of our work is to measure this decoherence time over a wide range of temperatures (0.4 K-100 K) and magnetic fields (1.25 T-17.5 T). Using THz time-domain spectroscopy (TTDS), we map the decoherence as a function of B and T. This talk will review previous work done at 0.4 K and 1.25 T; furthermore, we will discuss current work being done to increase our B dependence to 17.5 T using superconducting magnet 3 at the National High Magnetic Field Lab at Florida State University. This work utilizes a novel *reflection* TTDS system.

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