

Abstract Submitted
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Study of possible electron heating induced by microwave excitation in the GaAs/AlGaAs 2D electron system. THARANGA NANAYAKKARA, RASANGA SAMARAWEERA, ZHUO WANG, BINUKA GUNAWARDANA, Georgia State University, CHRISTIAN REICHL, WERNER WEGSCHEIDER, ETH-Zurich, 8093 Zurich, Switzerland, RAMESH MANI, Georgia State University, ETH-ZURICH COLLABORATION, GEORGIA STATE UNIVERSITY TEAM — Under the steady state of microwave excitation, there is a possibility of microwave induced electron heating in the two-dimensional electron system (2DES), due to absorption of energy from the radiation field. Electron-phonon scattering in the 2DES can then dissipate this excess energy onto the host lattice. According to previous studies, the electron temperature, longitudinal magnetoresistance, and energy absorption rate, show a non-monotonic variation with ω_c/ω , where ω_c is the cyclotron frequency, and ω is the radiation frequency [1]. It is also known that the Shubnikov de Haas (SdH) oscillation amplitude is sensitive to the electron-temperature [2]. In our experiment, we attempt to determine the effect of intense microwave photoexcitation on the resistance in a two-dimensional GaAs/AlGaAs electron system and try to correlate the observed resistance changes with the electron temperature extracted from the SdH oscillations. [1] X. L. Lei and S. Y. Liu, Phys. Rev. B 72, 075345 (2005). [2] A. N. Ramanayaka, R. G. Mani, and W. Wegscheider, Phys. Rev. B 83, 165303 (2011).

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