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THz quantum Hall conductivity in a two dimensional electron gas A.V. STIER, H. ZHANG, C.T. ELLIS, D. EASON, G. STRASSER, B.D. MCCOMBE, J. CERNE, University at Buffalo, The State University of New York — We investigate the THz Hall conductivity through measurement of the Faraday effect at 84 cm^{-1} near the cyclotron resonance (CR) in a two dimensional electron gas formed at a GaAs/(AlGa)As interface. Motivated by predictions of novel step-like features in the optical Hall conductivity (σ_{xy}) by Morimoto et.al. (Phys. Rev. Lett. 2009), we measure the THz σ_{xy} as a function of filling factor and temperature using polarization modulation techniques (Grayson, Phys. Rev. Lett. 2002). We observe plateaus in the Faraday rotation near integer filling factors of 1, 2 and 3 which we attribute to the THz integer quantum Hall effect. In electron density dependent studies, we observe a slight non-monotonic shift of the plateaus as a function of filling factor at magnetic fields above CR. A comparison of this effect with the shift in temperature shows that this cannot be explained by a simple electronic heating effect. This research was funded through NSF-DMR1006078.

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