

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

THz Charge Oscillations in a Modulation Doped Parabolic Quantum Well JAMES HEYMAN, LAURA BELL, JEFFERY ROGERS, Macalester College, JEREMY ZIMMERMAN, ARTHUR GOSSARD, University of California at Santa Barbara — We used ultrafast terahertz (THz) spectroscopy to observe THz-frequency electron oscillations in a modulation-doped InGaAs/AlGaAs parabolic quantum well. THz emission and absorption measurements yielded an electron sub-band spacing of 0.01eV, in agreement with sample design. Our study examined how the extrinsic electron density in the well influences THz emission efficiency, and we found no strong dependence. This indicates that THz emission in this structure arises from quantum beating of the photogenerated electrons. In contrast to a previously published report [1], we find that THz emission from the cold extrinsic electrons due to ultra-fast field screening plays at most a secondary role, even when the density of extrinsic electrons [$\sim 10^{11}$ cm $^{-2}$] exceeds the density of photogenerated charge. This work was funded by the National Science Foundation under the NSF-RUI Program (DMR-0606181).

[1] R. Bratschitsch, et. al., APL 76, 3501 (2000).

James Heyman
Macalester College

Date submitted: 01 Dec 2007

Electronic form version 1.4