Abstract Submitted
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Probing the combined effects of Dirac dispersion and spin-orbit coupling in HgTe-based 2DEGs[1] MEHDI PAKMEHR, University at Buffalo, The State University of New York, C. BRUENE, H. BUHMANN, LAUREN MOLENKAMP, University of Wurzburg, BRUCE MCCOMBE, University at Buffalo, The State University of New York — HgTe-based QWs show interesting behavior vs. well width (Dirac dispersion and a topological insulator state) due to the so-called "inverted" band structure (Γ_8 conduction band and Γ_6 valence band) of the bulk material. We have studied symmetric HgCdTe/HgTe-based QWs with "normal" band structure close to the Dirac point (width 6nm; critical width 6.3–6.6 nm) by magneto-transport and THz magneto-photoresponse (PR) measurements at low temperatures and in fields up to 10 T. Due to the relatively high carrier density (n_e =1.5x10^{12} cm^{-2}) the Fermi energy is well above the Dirac point, where one expects to observe effects of linear dispersion most clearly. We discuss how this situation leads to the measured values for the cyclotron resonance (CR) effective mass m* and g-factor. The CR mass was obtained both from separate transmission measurements and from fitting the envelope of the PR, while g-factors were obtained from fitting the splitting of the quantum oscillations. Additional interesting phenomena observed by THz photoresponse, e.g. beating patterns in quantum oscillations in the photoconductivity signal due to effective Rashba field, will also be discussed.

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