Abstract Submitted
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Microwave cyclotron resonance of two-dimensional holes in GaAs/AlGaAs quantum wells on (100) substrates HAN ZHU, K. LAI, D. C. TSUI, N. P. ONG, Princeton University, M. MANFRA, L. PFEIFFER, K. WEST, Bell Labs — Cyclotron resonance at microwave frequencies is used to measure the band mass (m_b) of two-dimensional holes (2DHs) in the GaAs/$Al_xGa_{1-x}As$ quantum wells grown on (100) GaAs substrates [1]. The measured m_b shows strong dependences on both the 2DH density (p) and the well width (W). For a fixed W, in the density range (0.4×10^{11} to 1.1×10^{11}cm^{-2}) studied here, m_b increases with p, consistent with previous studies of the 2DHs on the (311)A surface [2]. However, the density dependence is significantly weaker on the (100) surface than that on the (311)A surface for the same well width of 30nm. For a fixed $p = 1.1\times10^{11}$cm^{-2}, m_b increases from $0.22m_e$ at $W = 10$nm to $0.54\ m_e$ at $W = 20$nm, and stays around $0.51m_e$ for W up to 1000nm. With the transport measurement at 0.3K in the dark, the DC scattering time τ_{DC} deduced for $p = 1.1\times10^{11}$cm^{-2} shows a maximum of 0.6ns at $W = 20$nm. [1] M. J. Manfra *et al.*, Appl. Phys. Lett. 86, 16 (2005). [2] W. Pan *et al.*, Appl. Phys. Lett. 83, 3519 (2003).

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