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Temperature and Magnetic Field Enhanced Hall Slope of the Dilute 2D Holes in GaAs in the Ballistic Regime XUAN GAO, Los Alamos National Lab, GREG BOEBINGER, National High Magnetic Field Lab, ALLEN MILLS, UC, Riverside, ART RAMIREZ, LOREN PFEIFFER, KEN WEST, Bell Labs, Lucent Technologies — We report the temperature(T) and perpendicular magnetic field (B) dependence of the Hall resistivity $\rho_{xy}(B)$ of dilute metallic two-dimensional(2D) holes in high mobility GaAs quantum wells over a broad range of temperature(0.02-1.25K). The low B Hall coefficient, R_H, is found to be enhanced when T decreases. Strong perpendicular magnetic fields further enhance the slope of $\rho_{xy}(B)$ at all temperatures studied. Coulomb interaction corrections of a Fermi liquid in the ballistic regime ($k_BT > \hbar/\tau$ with τ being the scattering time) can not explain the enhancement of ρ_{xy} which occurs in the same regime as the anomalous metallic longitudinal conductivity. In particular, although the metallic conductivity in 2D systems has been attributed to electron interactions in a Fermi liquid, these same interactions should reduce, *not enhance* the slope of $\rho_{xy}(B)$ as T decreases and/or B increases. Preprint available at cond-mat/0411391.

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