Abstract Submitted
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Spin-orbit effects in two-dimensional hole systems on hydrogen-terminated silicon (111) surfaces BINHUI HU, TOMASZ M. KOTT, BRUCE E. KANE, University of Maryland — We have studied spin-orbit effects in two-dimensional hole systems (2DHSs) on hydrogen-terminated Si(111) surfaces using Shubnikov-de Haas (SdH) oscillations. The device has a vacuum field-effect transistor structure [1], and the 2DHS is induced on the H-Si(111) surface. Hole concentrations up to 8×10^{11} cm^{-2} are obtained, and the peak hole mobility is about 15,000 cm^2/Vs at T = 1.5 K. SdH oscillations show that the heavy hole subband is spin split due to spin-orbit effects. Both frequencies and beating node locations of the SdH oscillations are used to characterize the spin-orbit effects. The spin-splitting energy is measured as a function of the hole concentration, and the underlying physics will be discussed. Heavy-hole effective mass is determined by the temperature dependence of the SdH oscillations, and the relationship between the effective mass and the hole concentration will be presented. [1] K. Eng, R. N. McFarland, and B. E. Kane, Appl. Phys. Lett. **87**, 052106 (2005)

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