Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Ballistic hole transport and spin-orbit effects in GaAs quantum wires ALEX HAMILTON, R. DANNEAU, O. KLOCHAN, W.R. CLARKE, A.P. MICOLICH, L.H. HO, M.Y. SIMMONS, University of New South Wales, M. PEPPER, D.A. RITCHIE, University of Cambridge, K. MURAKI, Y. HIRAYAMA, NTT Basic Research Laboratories, U. ZUELICKE, Massey University — Studying the spin degree of freedom of charge carriers in semiconductors has become an area of significant current interest. Although spin-orbit coupling is extremely strong in p-type semiconductors such as GaAs, to date there have been only a limited number of experiments on holes in p-GaAs nanostructures. Here we present results from extremely high quality 1D hole quantum wires that show up to 10 clean and stable quantized conductance plateaus at B=0 [1.2]. The strong spin-orbit coupling leads to an extreme anisotropy of the Zeeman spin splitting of the 1D hole levels depending on whether the magnetic field is parallel or perpendicular to the quantum wire. Our results show that confining holes to a 1D system fundamentally alters their spin properties, and that it is possible to tune these properties by electrostatically changing the width of the 1D system [3]. [1] O. Klochan, *et al*, Appl. Phys. Lett. **89**, 092105 (2006). [2] R. Danneau, *et al*, Appl. Phys. Lett. **88**, 012107 (2006) [3] R. Danneau, *et al*, Phys. Rev. Lett., **97** 026403 (2006).

Alex Hamilton
University of New South Wales

Date submitted: 20 Nov 2006 Electronic form version 1.4