Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Kane model for the spin-splitting of holes in semiconductor heterostructures[1] ARTURO WONG, FRANCISCO MIRELES, Centro de Ciencias de la Materia Condensada, UNAM — We present a theoretical study of the Rashba-like spin-orbit coupling in two dimensional hole systems formed in zincblende semiconductor heterostructures. Using an 8X8 band Kane model within the envelope function approximation we derive exact analytical expressions for the Rashba-like Hamiltonians of the heavy, light and split-off holes [1]. The linear and cubic dependence in the wave vector of such Hamiltonians will be discussed. Simple analytical expressions for the spin-orbit coupling parameters can be also extracted from our model. A variational approach has been used in order to estimate the hole spin-splitting energies in typical III-V semiconductor quantum wells. Our preliminary results indicate that the magnitude of the spin-splitting energies for heavy holes is generically larger than their counterparts for electrons. This results could be of relevance for the design and implementation of novel (hole) transport spintronic devices. [1] A. Wong and F. Mireles (in preparation)

[1]This work has been supported in part by CONACYT/México, projects No. J40521F and 43673.

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Date submitted: 15 Jan 2006 Electronic form version 1.4