Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Electronic structure and transport properties of III-V core/shell nanowires FLORINDA VIÑAS, MARTIN LEIJNSE, Solid State Physics, Lund University, Sweden — We have modeled electron structure and low-temperature transport in III-V core/shell nanowires to establish a relationship between electron-hole hybridization and signatures in thermoelectrical measurements. Nanowires with a GaSb core and an InAs shell (and inverted) are interesting for studies of hybridization effects due to the bulk broken band gap alignment at the material interface. By varying the core radius and shell thickness of such wires we can modify the size of the band gap and create wires with band structures that exhibit hole-electron hybridization states.

The band structures are obtained using 8-band $k \cdot p$ theory together with the envelope function approximation. The calculated energy dispersions are used as input to the Boltzmann equation to study thermoelectric transport quantities such as the Seebeck coefficient, in the diffusive limit.

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Date submitted: 06 Nov 2015 Electronic form version 1.4