Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Electrical characterization of MOVPE-grown InSb nanowires HENRIK NILSSON, PHILIPPE CAROFF, CLAES THELANDER, MARCUS LARSSON, LARS-ERIK WERNERSSON, LARS SAMUELSON, HONGQI XU, SOLID STATE PHYSICS TEAM — In bulk, InSb is a narrow band gap (E_g = 170 meV) semiconductor with high electron mobility (μ_n = 77 000 cm^2/Vs) and is therefore of relevance for low power and high speed transistor applications. It also has a low electron effective mass ($0.015m_e$) and a very high electron g-factor |g|=51 which is of interest for studies of quantum and spin physics. InSb nanowires were grown by MOVPE from 40 nm Au aerosol seed particles deposited on a <111>B InAs substrate, where the growth was initiated by a 100 nm InAs segment. The InSb nanowires are untapered and free from stacking faults. The grown InSb nanowires were transferred to degenerately doped, SiO_2 capped, Si substrates. After locating the wires, Ti/Au contacts were made by electron beam lithography. Electrical measurements of the fabricated InSb nanowire devices were performed in the high bias, field-effect transistor (FET) regime at temperatures ranging from 300 K to 4.2 K as well as in the low bias, single-electron transistor (SET) regime at temperatures ranging from 4.2 K to 300 mK. In particular, effective electron g-factors and Kondo physics have been studied at low temperatures with the nanowire devices.

Henrik Nilsson

Date submitted: 21 Nov 2008 Electronic form version 1.4