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QMSA Measurements of III-V Heterostructures on Silicon[1] THIESS CUNNINGHAM, RAVI DROOPAD, Texas State University, RICHARD HILL, MAN HOI WONG, SEMATECH, TEXAS STATE UNIVERSITY COLLABORATION, SEMATECH COLLABORATION — There is widespread consensus that high mobility III-V channel materials will enable increased performance and reduced power consumption at scaled geometries. The industry is currently targeting the 11 nm technology node for their introduction. A most significant challenges is the heterointegration of III-V channel materials on Si substrates. Carrier transport of MBE grown InGaAs/InAlAs HEMTs on InP and Si substrates using Quantitative Mobility Spectrum Analysis (QMSA). Measurements taken determine effect of epitaxial defects on channel transport and buffer leakage. The continued scaling of Si CMOS devices has reached a point of, alternative solutions to conventional MOSFETs are needed. A solution considered is use of III-V compound semiconds as channel materials. However, requirements are that materials need be epitaxially integrated to silicon, be able to withstand the thermal budget in various CMOS processing modules. This presentation, will present the electrical characterization of MBE grown III-V InGaAs/InAlAs heterostructures on silicon. Transport measurements at various temperatures ranging from 10k-room temperature in magnetic fields from 0-10T. From these measurements, QMSA of the data is carried out to the densities and mobilities of the conducting and buffer layers.

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