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Low-temperature magnetotransport in Si/SiGe heterostructures on 300 mm Si wafers GIORDANO SCAPPUCCI, L. YEOH, D. SABBAGH, A. SAMMAK, J. BOTER, G. DROULERS, N. KALHOR, D. BROUSSE, M. VELDHORST, L. M. K. VANDERSYPEN, QuTech and Kavli Institute of Nanoscience, TU Delft, P.O. Box 5046, 2600 GA Delft, The Netherlands, N. THOMAS, J. ROBERTS, R. PILLARISETTY, P. AMIN, H. C. GEORGE, K J SINGH, J S CLARKE, Components Research, Intel Corporation, 2501 NW 229th Ave, Hillsboro, OR 97124, USA — Undoped Si/SiGe heterostructures are a promising material stack for the development of spin qubits in silicon. To deploy a qubit into high volume manufacturing in a quantum computer requires stringent control over substrate uniformity and quality. Electron mobility and valley splitting are two key electrical metrics of substrate quality relevant for qubits. Here we present low-temperature magnetotransport measurements of strained Si quantum wells with mobilities in excess of 100000 cm^2/Vs fabricated on 300 mm wafers within the framework of advanced semiconductor manufacturing. These results are benchmarked against the results obtained in Si quantum wells deposited on 100 mm Si wafers in an academic research environment. To ensure rapid progress in quantum wells quality we have implemented fast feedback loops from materials growth, to heterostructure FET fabrication, and low temperature characterisation. On this topic we will present recent progress in developing a cryogenic platform for high-throughput magnetotransport measurements.

G. Scappucci
QuTech and Kavli Institute of Nanoscience, TU Delft

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