Abstract Submitted
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Raman Spectroscopic Mapping of Strain Distribution in Si/SiGe Heterostructures Y. BAO, K.A. ALIM, M. SHAMSA, W.L. LIU, A.A. BALANDIN, Nano-Device Laboratory (http://ndl.ee.ucr.edu/), Department of Electrical Engineering, University of California, Riverside, CA 92521 — Strain in Si/SiGe heterostructures and GeSi/Si quantum dot superlattices may strongly affect the carrier mobility [1]. In this talk we report mapping of the inhomogeneous strain field distribution in 10 nm strained Si layer using cross-sectional Raman spectroscopy. The tensile-strained Si layers were grown on a $Si_{0.8}Ge_{0.2}$ buffer layer by the solid-source molecular beam epitaxy in UCLA. The post-growth sample preparation allowed us to carry out Raman scans across the layers of the structure. The stress and the lattice mismatch values have been extracted from the measurements of the Raman peak shifts. The obtained experimental values of $\varepsilon_{\perp}$ and $\varepsilon_{||}$ are about -4.24 $\times$ 10^{-3} and 3.27 $\times$ 10^{-3}, while the stresses values are $\sigma_{\perp}$ = -0.91 GPa and $\sigma_{||}$ = 1.18 GPa. [1] Y. Bao, A.A. Balandin, et al., Appl. Phys. Lett., 84, 3355 (2004).

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