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Interplay of Phonon Confinement and Thermal Phenomena on the 520 cm-1 Raman band in Very Small Diameter Silicon Nanowires PETER C. EKLUND, KOFI W. ADU, UN J. KIM, HUMBERTO R. GUTIERREZ, The Pennsylvania State University — Results of Raman experiments that investigate the influence of laser flux and thermal anchoring on the asymmetric line profile $\sim$520 cm^{-1} optical phonon scattering from small diameter Si nanowires are presented. At low laser flux $\Phi \leq 20\mu\mathrm{W}/\mu\mathrm{m}^2$, the lineshape seems well described by a phenomenological lineshape function associated with phonon confinement due to Richter et al[1]. However, at high laser flux $\geq$ 100 $\mu\mathrm{W}/\mu\mathrm{m}^2$, the Raman band takes on even higher asymmetry that is likely due to inhomogenous heating. The data at low and high laser flux can be explained quantitatively on the basis of fundamental Raman scattering theory. [1] H. Richter, Z. P. Wang, and L. Ley, Solid State Communcations, **39**, 625 (1981) †Work supported by the NSF NIRT program (DMR- 0304178).

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