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Non-Linear Raman Scattering from Semiconducting GaP Nanowires A. GUPTA, JIAN WU, P.C. EKLUND — Results of polarized micro-Raman scattering from LO and TO phonons in individual GaP nanowires (NWs) with different diameter and length are reported. The NW diameters were determined by Atomic Force Microscope (AFM) and length was measured by Scanning Electron Microscope (SEM). NWs with the same growth direction but variable length were prepared by cutting $\sim$40 μm long wires into segments using a Focused Ion Beam. The polar plots of the back scattered intensity $I_{TO,LO}(\theta)$ from these segments were collected, where θ is the angle between the incident electric field and the NW axis. Interestingly, the shapes of these polar patterns depend on both the length and diameter of the NWs. The Raman scattering intensities for short wires (i.e., L$<$1μm) also exhibit a non-linear dependence on the incident laser power I_0. The non-linearity increases with decreasing NW length and behaves as $\sim I_0^{1.5}$ for the shortest wires measured so far (i.e., L$\sim$500 nm). Our results strong suggest strong enhancement in the internal electric field via antenna effects. This work is supported by NSF NIRT, grant DMR-0304178.

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