

Abstract Submitted  
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**Raman Antenna Effect in Semiconducting Nanowires.** GUGANG CHEN, QIHUA XIONG, PETER EKLUND, Department of Physics, The Pennsylvania State University — A novel Raman antenna effect has been observed in Raman scattering experiments recently carried out on individual GaP nanowires [1]. The Raman antenna effect is perfectly general and should appear in all semiconducting nanowires. It is characterized by an anomalous increase in the Raman cross section for scattering from LO or TO phonons when the electric field of the incident laser beam is parallel to the nanowire axis. We demonstrate that the explanation for the effect lies in the polarization dependence of the Mie scattering from the nanowire and the concomitant polarization-dependent electric field set up inside the wire. Our analysis involves calculations of the internal electric field using the discrete dipole approximation (DDA). We find that the Raman antenna effect happens only for nanowire diameters  $d < \lambda/4$ , where  $\lambda$  is the excitation laser wavelength. Our calculations are found in good agreement with recent experimental results for scattering from individual GaP nanowires. [1] Q. Xiong, G. Chen, G. D. Mahan, P. C. Eklund, in preparation, 2006.

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