Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

**Raman Spectroscopy on GaAs/GaP Nanowire Axial Heterostructures**[1] YUDA WANG, MOHAMMAD MONTAZARI, LEIGH SMITH, HOWARD JACKSON, University of Cincinnati, JAN YARRISON-RICE, Miami University, QIANG GAO, JUNG-HYUN KANG, CHENNUPATI JAGADISH, Australian National University — We use Raman scattering to study the spatially-resolved strain and stress in Zinc Blende GaAs/GaP axial heterostructure nanowires at room temperature. The nanowires are grown by Metal-Organic Chemical Vapor Deposition in the [111] direction with Au nano particles as catalysts. After initial growth of a 6 $\mu$m-long GaP wire, a short GaAs segment is grown. Since Raman scattering reflects the phonon energies that are in turn related to the stress, we control the polarization of the incident and scattered light to acquire and resolve the TO1 (Transverse Optical) and TO2 phonon modes of both GaAs and GaP. High spatial resolution Raman scans along the nanowires show that the GaAs/GaP interface is clearly identifiable. Within the GaP section of the wire, GaP TO modes are observed at lower energies compared to bulk GaP since it is under tension, while GaAs shell TO modes are at higher energies than bulk GaAs since it is under compression. A strain gradient exists across the interface so the GaP phonon energies shift to lower and GaAs phonon shift to higher energies as one approaches the interface.

[1]We acknowledge the NSF through DMR-1105362, 1105121 and ECCS-1100489, and the ARC.

Yuda Wang
University of Cincinnati

Date submitted: 14 Nov 2012 Electronic form version 1.4