Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Variation of Wurtzite InP Nanowire Photoluminescence With Diameter[1] SARANGA PERERA, K. PEMASIRI, A. WADE, L.M. SMITH, H.E. JACKSON, University of Cincinnati , J.M. YARRISON-RICE, Miami University, S. PAIMAN, Q. GAO, H. TAN, C. JAGADISH, Australian National University — We use time-resolved photoluminescence (PL) spectroscopy to study the PL variations of nanowires (NWs) at 12 K with nominal diameters of 5, 20, 30, 50, 100,and 150nm. The NWs were prepared by Au catalyst-assisted MOCVD growth with 420C growth temperature and V/III ratio of 700. A pulsed Titanium-Sapphire laser (780nm) was used to excite the nanowire sample. We observed time-resolved PL from single NWs from each of the NW samples. In 5, 20, 30nm diameter NW samples, we observe a PL peak around 810-820 nm at early times which decays rapidly leaving a long-lived defect-related emission peak. In the 100 nm and 150nm samples at early times we observe a PL peak around 825nm that evolves at later times to a long-lived defect emission line at 850nm. Some quantum confinement should be expected as the NW radius becomes smaller than the Bohr radius particularly for the 5 nm and 20 nm samples. We report on possible evidence for quantum confinement of the excitons.

[1]Support for this work was provided by the NSF (0701703, 0806700 and 0806572) and the Australian Research Council.

Leigh Smith
University of Cincinnati

Date submitted: 24 Nov 2009 Electronic form version 1.4