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Investigation of the Electronic Structure of GaAs/AlGaAs Core Multi-Shell Nanowires[1] S. PERERA, M.A. FICKENSCHER, T.B. HOANG, H.E. JACKSON, L.M. SMITH, University of Cincinnati, J.M. YARRISON-RICE, Miami University, H.J. JOYCE, Q. GAO, Y. KIM, H.H. TAN, C. JAGADISH, Australian National University — We use photoluminescence and PL excitation spectroscopy to study the electronic structure of GaAs/Al_xGa_xAs core multi-shell NWs. Using Au-catalyst assisted MOCVD, a 10 nm GaAs quantum well tube (QWT) with AlGaAs barriers is formed surrounding a central ∼50 nm GaAs core. With resonant excitation at 780 nm emission is seen from both the core as well as the QWT. The QWT emits in a narrow intense peak ∼22 meV above the exciton emission from the core suggesting quantum confinement in a 10 nm quantum well. This QWT emission exhibits a ∼600 ps recombination lifetime, while the core decays in ∼1 ns. Preliminary PLE measurements exhibit possible excited state structure of this novel quantum-confined nanostructure.

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