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Optical Properties of Carbon Nanotubes in Semiconductor/NT Hybrids O. N. TORRENS, D. E. MILKIE, M. F. ISLAM, A. G. YODH, J. M. KIKKAWA, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA 19104, A. KHANDEKAR, T. F. KUECH, Department of Chemical Engineering, University of Wisconsin-Madison, WI 53706 — We report on etch processing and optical measurements of hybrid GaAs-Nanotube materials. Samples are created by OMVPE growth over GaAs vicinal substrates coated with single-wall laser-oven carbon nanotubes (SWNTs). We use scanning confocal Raman and photoluminesence microscopy to study the incorporation of SWNTs into the GaAs matrix. We further present procedures for patterning these samples into islands separated by V-grooves and interconnected by suspended SWNTs. Strategies for performing time-resolved studies of spin coherent transport across SWNTs will be discussed. Preliminary results of two-color, time-resolved Faraday rotation in unpatterned hybrid structures reveal unconventional phase shifts in coherent dynamics of spins in the GaAs matrix. JMK acknowledges support from DARPA/ONR N00015-01-1-0831, TFK acknowledges support from ARO, and DEM acknowledges support from NSF IGERT DGE-0221664.

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