Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Photoluminescence from inter-tube carrier migration in single-walled carbon nanotube bundles[1] O. N. TORRENS, D. E. MILKIE, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA 19104, M. ZHENG, DuPont Central Research and Development Experimental Station, Wilmington, DE 19880, J. M. KIKKAWA, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA 19104 — We detect new, dominant PL features from aqueous suspensions of single-walled carbon nanotubes (SWNTs) associated with energy transfer between semiconducting species in SWNT bundles.[1] In these bundles, excitons are resonantly photoexcited at the E22 excitonic transition of populous, large bandgap SWNTs ((6,5), (7,5), and (8,3)). Excited excitons then efficiently migrate to smaller bandgap SWNTs ((7,6), (8,4), and (9,2)) and radiatively relax by emitting photons resonant with the E11 excitonic transition of these less common species. These energy transfer (ET) emission peaks demonstrate efficient exciton coupling between different SWNT species within bundles. Aqueous SWNT solutions with low levels of metallic SWNTs prevent quenching of bundle PL, and linear dichroism measurements of SWNT magnetic alignment detect bundle formation. [1] O. N. Torrens, D. E. Milkie, M. Zheng, J. M. Kikkawa, Nano Lett. (in press).

[1]Supported by NSF DMR-0520020 and DMR-0094156.

Daniel Milkie
Department of Physics and Astronomy,
University of Pennsylvania, Philadelphia, PA 19104

Date submitted: 02 Dec 2006 Electronic form version 1.4