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**Low Magnetic Field Effects in Single-Walled Carbon Nanotubes**[1]

D. E. MILKIE, O. N. TORRENS, J. M. KIKKAWA, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA, 19104 — We observe room temperature, sub-Tesla magnetic field effects on the photoluminescence of aqueous suspensions of single-walled carbon nanotubes and on the electrical transport of carbon nanotube composites. The nearly identical field scale found in both cases suggests a common origin for the phenomena. In aqueous suspensions, weak magnetic fields decrease the nanotube photoluminescence intensity by $\sim$0.1% - 1%, an effect which saturates by $\sim$1 Tesla. We explore this magnetic darkening as a function of surfactant, magnetic field and direction, temperature, and nanotube chirality. For carbon nanotube epoxy composites and aerogels, low magnetic fields produce a similar decrease in the device resistivity, which is found to be temperature dependent. We discuss these new magnetic field effects in the context of excitonic magneto physics and magnetic field effects observed in other organic semiconductor systems.

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D. E. Milkie
Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA, 19104

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