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Vortices in One Dimension: A Soliton Analysis of Gapped Carbon Nanotubes MARK SWEENEY, JOEL EAVES, Department of Chemistry and Biochemistry, University of Colorado, Boulder — We study the optical properties of carbon nanotubes using the bosonization technique. The action has a general sine-Gordon form and the fundamental excitations are solitons and antisolitons. The bound soliton-antisoliton of the system is an exciton. Using a mean-field analysis we find bright and dark excitonic energies that are in good agreement with experimental values. Further, the large energy differences between the exitonic spectra and the single particle spectra agrees with perturbative treatments: Bethe-Salpeter excitonic energies compared to Hatree-Fock single particle energies.

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