Abstract Submitted
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Chiral dependence of K-momentum exciton energies in carbon nanotubes[1] P.M. VORA, Department of Physics and Astronomy, University of Pennsylvania, X. TU, M. ZHENG, DuPont Central Research and Development, J.M. KIKKAWA, Department of Physics and Astronomy, University of Pennsylvania — Fifteen of the sixteen excitons in the E_{11} manifold of carbon nanotubes are nominally dark. Of these, the zero-momentum dark singlet has received the most experimental attention because it exhibits magnetic brightening. By contrast, here we focus on the K and K'-momentum dark singlets. Absorptive (X_2) and emissive (X_1) sidebands appearing at $\sim$0.2 eV above and $\sim$0.13 eV below the bright exciton, respectively, have been interpreted in numerous ways in the literature. Recently, members of our group studied these sidebands in a (6,5) nanotube and concluded they could be used to energetically locate the K-momentum excitons (Torrens, et al, PRL 101, 157401 (2008)). Here we use a combination of experiment and theory to study X_1 and X_2 in at least ten samples that are highly purified in a single chirality and use these findings to study how the K-momentum exciton energy depends on chirality.

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