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High energy E_{11} excitons above the continuum threshold in semiconducting single-walled carbon nanotubes[1] HONGBO ZHAO, School of Physics and Telecommunication Engineering, South China Normal University, SUMIT MAZUMDAR, Physics Department, University of Arizona — Although the excitonic nature of the primary photoexcitation has been firmly established in semiconducting single-walled carbon nanotubes (S-SWCNTs), the magnitude of the exciton binding energy is still being debated. Recent photoluminescence excitation experiments have detected excitons above the threshold of the continuum band predicted from two-photon absorption measurements in the (10,6) S-SWCNT [2] One interpretation of this experiment is that the exciton binding energy is much larger than previous estimates [3] We have performed configuration interaction calculations for the (10,6) S-SWCNT within the molecular PPP model that quantitatively reproduces the earlier estimate for the exciton binding energy and also finds excitons deep inside the continuum. A similar observation has previously been made for the conjugated polymer PPV.

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[2]J. Lefebvre and P. Finnie, Nano Lett. **8**, 1890 (2008).
[3]J. Deslippe et al., Nano Lett. **9**, 1330 (2009).

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