

Abstract Submitted
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Spontaneous exciton dissociation in carbon nanotubes¹ MASAHIRO YOSHIDA, YUSUKE KUMAMOTO, AKIHIRO ISHII, AKIO YOKOYAMA, TAKASHI SHIMADA, YUICHIRO K. KATO, The University of Tokyo — Simultaneous photoluminescence and photocurrent measurements on individual single-walled carbon nanotubes reveal spontaneous dissociation of excitons into free electron-hole pairs.² A simple model is constructed to consistently describe the excitation power and voltage dependence of the photoluminescence and photocurrent. Using this model, we find that a significant fraction of excitons are dissociating before recombination. Furthermore, the combination of optical and electrical signals also allows for extraction of the absorption cross section and the oscillator strength. Our observations explain the reasons for photoconductivity measurements in single-walled carbon nanotubes being straightforward despite the large exciton binding energies.

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²Y. Kumamoto *et al.*, arXiv:1307.5159 (2013).

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