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Exciton dynamics in DNA suspended SWNT agglomerates: From delocalized to one-dimensionally confined excited states JARED J. CROCHET, Vanderbilt University, MICHAEL ARNOLD, Northwestern University, MARK HERSAM, Northwestern University, ZIPENG ZHU, Vanderbilt University, TOBIAS HERTEL, Vanderbilt University — Exciton dynamics in chirality enriched, DNA suspended single-wall carbon nanotube agglomerates are studied using linear absorption, spectrofluorimetry, and ultrafast pump-probe spectroscopies. Suspended SWNT ropes with controlled diameter are isolated using isopycnic density gradient fractionation. Photoluminescence quantum yields are found to decrease with increasing rope diameter concomitantly to a broadening and redshift of exciton transitions. Spectrally resolved optical transients reveal that excited state dynamics are characterized by an increase of E_{11} subband exciton decay rates as the rope size increases. These findings are discussed in terms of the roles of intertube coupling and exciton delocalization.

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