

Abstract Submitted
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Ultrafast dynamics of one-dimensional excitons in metals and semiconductors. TOBIAS HEREL, Vanderbilt University — Exciton resonances in metallic and semiconducting carbon nanotubes (CNTs) allow insights into the unique nature and peculiarities of excited states with one-dimensional character. We discuss recent advances and discoveries in this exciting field of materials research with particular focus on the ultrafast dynamics of exciton decay in structurally and electronically sorted carbon nanotube samples. Among others we discuss changes in the photophysical properties of one-dimensionally localized excitons in individual single-wall carbon nanotubes and of more delocalized states in semiconducting nanotube-crystals and how these changes relate to fundamental aspects of carrier interactions in confined systems. In addition we explore the detailed mechanisms and the importance of electronic and vibrational degrees of freedom for energy redistribution in CNTs. Lastly, we will clarify the relevance of these findings for the potential implementation of carbon nanotubes in new technologies such as flexible electronics, sensing-, photovoltaics and biomedical applications.

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