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A Study of the Polarizability of Single-Walled Carbon Nanotubes in an Optical Field JINGYU WANG, H. DANIEL OU-YANG, Lehigh University — Whereas the behavior of single-walled carbon nanotubes (SWCNT) in an electric field has been extensively studied, the polarizability of SWCNTs at optical frequencies remains unclear due to the difficulty in direct detection. It was demonstrated by utilizing Raman spectroscopy as a characterization means, optical tweezers could selectively aggregate SWCNTs. While it was commonly believed that the trapping effect due to the large optical field gradient caused the strong response of tubes to the laser beam, we expect the aligning effect due to the optical polarization also has a considerable contribution. To quantify these two possible effects experienced by an ensemble of individual DNA-SWCNTs of different chiralities, and address the issue of tube-tube interaction, We design an experiment by applying optical tweezers with variable polarization states and insepcting resonance Raman excitation for sensitive detection. Specifically, we measure the radial breathing mode signal of SWCNTs as a function of laser power and the direction of polarization for different tube types and concentrations. The research may lead to a more complete understanding of sorting phenomenon of individual SWCNTs in an optical field at microscopic level.

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