S10-I2

Terahertz range electrodynamics and possible optoelectronic applications of carbon nanotube films.

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The great potential individual carbon nanotubes have for the future nanoelectronics [1,2] has yet to be realized. At the same time carbon nanotube films that contain different types of nanotubes find different applications including, but not limited to transparent electrodes, flexible sensors, energy storage electrodes, and others.

Here we report on our recent results regarding electrodynamics of carbon nanotube films produced by Aerosol chemical vapor deposition (CVD) technique. We show that dynamic conductivity of these film is well described within Drude model with a scattering rate of about 10 THz that results in untrivial behavior of submicron-thick suspended CNT films, including negative phase velocity controllable by optical pumping [3].

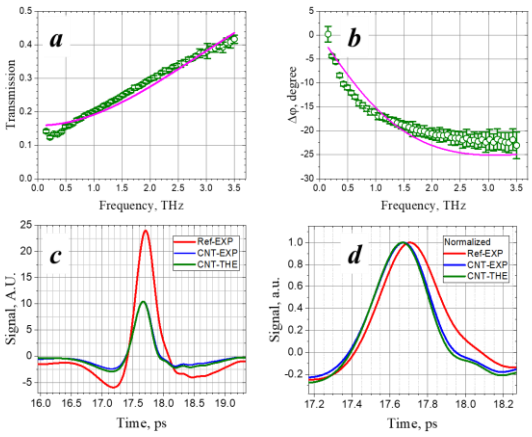

Fig. 1 Upper panel: Power transmission (a) and phase (b) as a function of frequency. Dots show experimental data, olive solid lines are the results of simulations. Lower panel: The as-measured signals (c) and normalized signals (d). Simulations are based on the Drude model for the CNT.

This work was supported by HORIZON-EIC-2025-PATHFINDEROPEN THz-Skin project 101257203 and EU Horizon 2024 MSCA project 101236439 (HERMES)

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