Terahertz Spectroscopic Reflection and Scattering Measurements of Aligned CNT Arrays as a Function of Carbon Nanotube Length

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Experiments in the AFIT Radar Instrumentation Laboratory

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The AFIT Radar Instrumentation Laboratory (RAIL) mission is to develop new data collection strategies, novel processing algorithms, and informative data products for a variety of radar modes, configurations, and waveforms through cutting-edge research and scholarship. We aim to equip our students with the next generation of smart radar tools and technologies. RAIL hosts a suite of test equipment used in AFIT’s radar curriculum and research experiments. The LabVolt Radar Training System enables students to work with radar equipment at safe radiation levels. Tektronix waveform generation and measurement equipment supports efficient data collection and analysis. Research students can take advantage of the test equipment to explore new theoretical concepts with small scale experiments. This poster showcases recent experiments in statistical characterization of radar ground clutter and passive radar imaging using OFDM waveforms.

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Reflectance and scattering measurements were made on vertically aligned carbon nanotube arrays of varying lengths grown on quartz substrate. Measurements are performed with copper as reference using terahertz time-domain spectroscopy. Direct reflection and scattering results indicate a frequency-related dependence on the length of the carbon nanotubes and the angle of incident radiation.