

# Photonic generation and detection of millimeter-wave pulses by 1550 nm-based THz Time-Domain Spectrometry

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**Abstract:** Technologies for generating and detecting THz electromagnetic pulse have attracted a lot of interest during the past decades due to the considerable applications such as material inspection, spectroscopy sensing and communications. Among these techniques, the use of THz time domain spectroscopy (THz-TDS) based on a Ti:sapphire laser system has been proven successful and being employed in research nowadays. However, recent trend has suggested using ultrafast fiber laser instead of Ti:sapphire laser due to its compact design. The Er-doped fiber laser (EDFL), in particular, is suitable for the fiber-coupled THz-TDS system in conjunction with the abundant fiber components in optical communication systems.

In this talk, results on a home-made 1550 nm THz-TDS system will be presented. This technique allows both photonically-assisted millimeter-wave (MMW) generations and ultra-fast coherent detections when applying a high-power sub-THz photonic transmitter (PT). We will present our recent results on characterizations of frequency response of the PTs. Besides, potential applications such as the photonic generations of narrow-band MMW pulses and frequency-modulated MMW waveforms by femtosecond pulse shaping on the EDFL will also be discussed.