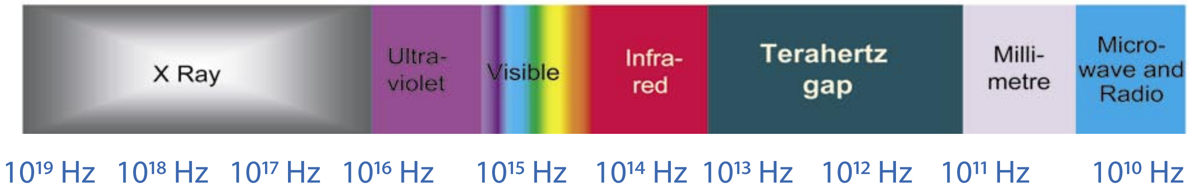
Pacifica

Femtosecond Terahertz Spectrometer

Terahertz spectroscopy and microscopy are becoming a powerful tool in biology, medicine, semiconductor physics and in many applications including homeland and defence security. The spectral range(10^{11} -10^{13} Hz) is of great interest for spectroscopy because the vibrational frequencies of molecules in gases and liquids, optical phonon frequencies in solids, vibrational frequencies of polyatomic biological molecules, etc lie in this range. Terahertz radiation bridges the gap between the microwave and optical regimes.



Terahertz-wave generation and detection have gained increasing interests from fundamental and applied perspectives. The scope of THz studies and application include molecular science, solid-state physics, biomedical application, diagnostics, ultra-high speed optical communication and so forth.

Much of the recent interest in terahertz radiation stems from its ability to penetrate deep into many organic materials without the damage associated with ionizing radiation such as X-rays. Terahertz radiation can also help scientists understand the complex dynamics involved in condensed-matter physics and processes such as molecular recognition and protein folding.

High penetration:
penetrates clothing, leather, paper, plastics, packing materials

Spectral Identification capabilities:
chemical analysis using characteristic Terahertz spectra

Unique properties of Terahertz light

Non-ionizing radiation and low power so that there is no damage

3D imaging capability

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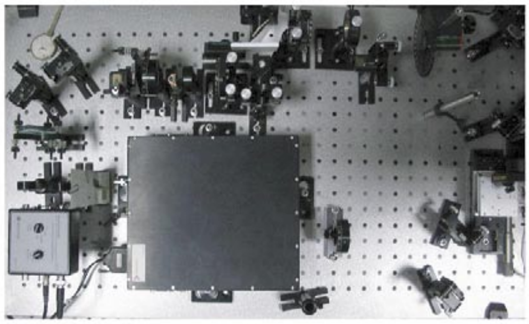
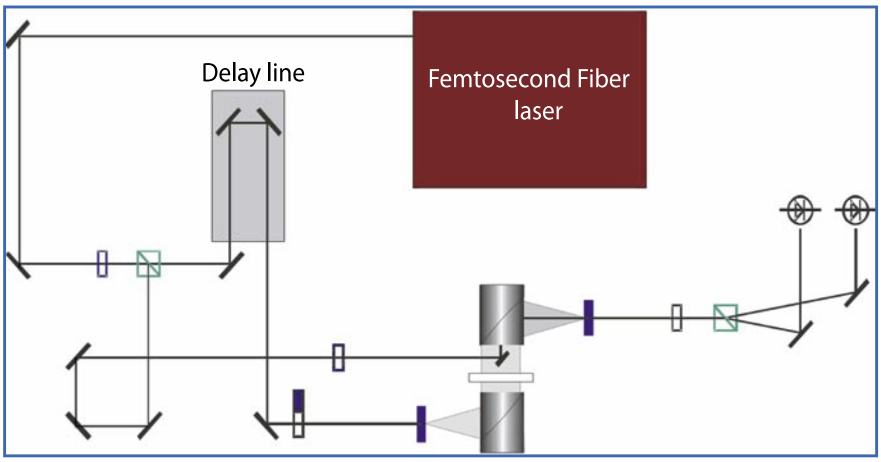
Terahertz (THz) pulses generated by the femtosecond laser pulses of optical range are widely employed in the last years. There exist several techniques for generating THz pulses: with dipole antennas based on the Auston switch, in which pulsed radiation is generated due to nonstationary electron-hole photo-conductivity of a semiconductor induced by short light pulses; with photoconductive dipole antenna or a nonlinear crystal and other methods.

Del Mar Photonics THz spectrometer, Pacifica, is designed for obtaining THz spectra by using of THz pulses generated by femtosecond laser in oriented ZnTe crystal. ZnTe crystal is virtually transparent in the frequency region 0.1-3.5 THz and phase-matching conditions for THz pulse generation are well fulfilled. Therefore, ZnTe crystal is now one of the most efficient materials for generating THz pulses upon photoexcitation.



Spectral range	Signal/noise	Dimensions
0.1 - 3.5 THz (costomized)	1:4000	95 x 45 cm

Spectral range and configuration (reflection, transmission and etc) in Pacifica spectrometer can be adjusted for specific customer configuration. Please contact us to discuss your application and requirements.



Example of experimental layout for Femtosecond Terahertz Pacifica spectrometer

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