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Title:Study on high sensitivity and low noise electro-optic terahertz detector

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Abstract: An electro-optic terahertz (THz) detector with a newly-designed circuit was investigated. A pair of high-quality PIN photodiodes and a low-noise current-voltage conversion circuit were applied to convert the modulated probe laser to voltage signal. These two voltage signals were specially-designed differential high subsequently sent to а amplifier with common-mode-rejection-rate (CMRR) that largely restrain the noise of terahertz signal and avoid the disturbance of probe laser intensity. Then a band-pass filter was employed to control bandwidth and restrain noise of the detected signal. Finally, the weak THz signal was detected via a main amplifier. Experimental results show that the THz detector has high signal-to-noise-ratio (SNR), teeny distortion and wide bandwidth, which fully satisfy the requirement of terahertz time-domain spectroscopy (THz-TDS).

Number of references:12

Main heading:Signal to noise ratio

Controlled terms:Bandpass filters - Differential amplifiers - Disturbance rejection - Laser pulses -Lasers - Plasmons - Probes - Spectrophotometers - Terahertz spectroscopy - Voltage measurement Uncontrolled terms:Electro-optic detection - Sensitivity - Signal-to-noise-ratio (SNR) - Terahertz -Terahertz time domain spectroscopy

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