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Correction of FTIR acquired photodetector response spectra from mid-infrared to visible bands using onsite measured instrument function

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Abstract:

A scheme was validated for the correction of experimentally acquired response spectra of quantum type photodetectors (PDs) in a wide wavelength range from mid-infrared to visible bands. The scheme was based on Fourier transform infrared (FTIR) spectrometer equipped thermal type pyroelectric detector with light wavelength independent but electrical frequency dependent response. Through onsite measurement of the output of FTIR spectrometer at a wide range of moving mirror scan speed, the electrical frequency dependence of the pyroelectric detector was extracted precisely, then the instrument function or power spectral density of the FTIR system was calibrated available. Based on calibrated instrument function, FTIR acquired spectral responses of a group of InGaAs and Si PDs were corrected effectively. The feasibility and practicability of the correction scheme were confirmed by comparison of corrected results to calibrated standard data of the PDs. The limitations of the scheme and matters needing attention were also discussed in detail.

Key words: Response spectrum; Photodetector; FTIR; Photocurrent spectroscopy; FTIR instrumentation; Instrument function;

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