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Title:Spectral waveform measurement of 2 THz optical frequency comb by dual-heterodyne mixing

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Abstract:A technique for measuring the relative phase between optical longitudinal modes in an optical frequency comb (OFC) has been proposed, and applied to the characterization of the OFC. The measurement frequency range was expanded to 2 THz using the OFC of a line spacing of 10 GHz. Furthermore, an algorithm for data analysis was proposed by calculating Fourier transformation of the fragmentized waveform of the data measured by the dualheterodyne mixing method. As a result, a pulse width of 2.1 ps was observed on a time scale of 100 ps with a resolution of 500 fs, which is inversely proportional to the measured frequency band in general (2 THz in this study). These results were also compared with those obtained from an optical autocorrelator. The measured electric field spectra provide a lot of information, involving a frequency-resolved optical gating (FROG) trace and a phase variation profile plotted against time. Amplitude and phase spectral evolutions were reconstructed directly from the electric field spectra and referred to as a dual-heterodyne mixing trace. In conclusion, it was confirmed that the proposed technique is effective in reading out detailed information from the ultrafast waveform measurement. © 2012 Optical Society of America.

Number of references:12

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Uncontrolled terms:Autocorrelators - Fourier - Frequency-resolved optical gatings - Line spacing - Longitudinal modes - Measurement frequency - Mixing method - Optical frequency combs - Phase variation - Pulsewidths - Relative phase - Spectral evolution - Time-scales - Ultra-fast - Wave forms - Waveform measurement

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