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Title:Ultrafast optical frequency comb synthesizer and analyzer

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Abstract:We propose an ultrafast optical arbitrary waveform synthesizing/analyzing technique demonstrated with 2 Tbit/s waveforms. An ultrafast waveform was generated by manipulating the amplitude and phase of a 400 GHz optical frequency comb using a newly developed colorless optical synthesizer. The 400 GHz optical frequency comb was generated from a 25 GHz optical frequency comb using a colorless arrayed waveguide grating. This waveform was then analyzed on the frequency axis using a custom heterodyne-detection technique based on the dual-heterodyne mixing method. The phase and amplitude spectra can be observed in parallel using another optical frequency comb as a reference combined with an arrayed waveguide grating. This optical system, named the ultrafast optical frequency comb synthesizer and analyzer, can synthesize and analyze an arbitrary waveform in the THz frequency region. © 2012 Optical Society of America.

Number of references:13

Main heading:Natural frequencies

Controlled terms:Arrayed waveguide gratings - Heterodyning - Optical materials - Optical systems

Uncontrolled terms:Amplitude spectra - Arbitrary waveform - Frequency axis - Mixing method - Optical frequency combs - Optical synthesizers - THz frequencies - Ultra-fast - Wave forms

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