281. Accession number:20123215323681
Title:Photonic generation and detection of W-band chirped millimeter-wave pulses for radar
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Source title:IEEE Photonics Technology Letters
Abbreviated source title:IEEE Photonics Technol Lett
Volume:24
Issue:16
Issue date:2012
Publication year:2012
Pages:1437-1439
Article number:6225421
Language:English
ISSN:10411135
CODEN:IPTLEL
Document type:Journal article (JA)
Publisher:Institute of Electrical and Electronics Engineers Inc., 445 Hoes Lane / P.O. Box 1331, Piscataway, NJ 08855-1331, United States
Abstract:Based on the frequency-to-time mapping approach, we generate frequency-modulated millimeter-wave (MMW) pulses with central frequencies up to the W-band by a shaped optical pulse excitation of an MMW photonic transmitter with an ultrawide band photodiode as its key component. A coherent detection is achieved via a terahertz time-domain spectroscopic setup. Two different kinds of chirped MMW waveforms are generated; one is a linearly chirped sinusoidal pulse and the other is produced by a frequency-stepped modulation. Through appropriate optical spectral design, the frequency-chirped MMW pulses with instantaneous frequencies sweeping from 120 to 60 GHz, and a time-bandwidth product of ∼25 is experimentally demonstrated. 
Number of references:14
Main heading:Millimeter waves
Controlled terms:Bandwidth - Diodes - Product design - Transmitters
Uncontrolled terms:Central frequency - Coherent detection - Instantaneous frequency - Photonic transmitter - Pulse excitation - Pulse-shaping - Sinusoidal pulse - Spectral design - Terahertz - Time domain - Time-bandwidth products - Wave forms
Classification code:711 Electromagnetic Waves - 714.2 Semiconductor Devices and Integrated Circuits - 716 Telecommunication; Radar, Radio and Television - 716.1 Information Theory and Signal Processing - 913.1 Production Engineering
DOI:10.1109/LPT.2012.2205914
Database:Compendex