494. Title:Enhanced performance of narrowband millimeter-wave generation using shaped-pulse-excited photonic transmitters

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Source title:IEEE Photonics Technology Letters
Volume:23
Issue:13
Issue date:2011
Publication year:2011
Pages:902-904
Language:English
Document type:Journal article (JA)

Abstract:We demonstrate a novel method to greatly enhance the narrowband millimeter-wave (MMW) power generation by use of a near-ballistic uni-traveling-carrier photodiode-based photonic transmitter (PT) excited by shaped optical pulses. The spectrum of the best tailored optical pulses is centered at 1545 nm and spread among 16 main frequency components (channels), each with a spectral width of 15.5 GHz and a spacing of 93 GHz. Compared with quasi-sinusoidal optical modulation, we achieve an enhancement in the spectral power density by ∼25 times. The power-enhanced narrowband MMW signal can be tuned over ∼80 GHz (60-142 GHz). In addition, we observe significant enhancement of MMW peak power with an increase of the reverse bias voltage.