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Title:Generation of high power tunable multicycle terahertz pulses

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Abstract:We demonstrate generation of high-power, multicycle, and frequency-tunable terahertz pulses with microjoule energies by tilting the intensity front of a quasi-sinusoidal intensity-modulated optical waveform. The spatiotemporally shaped waveform undergoes difference-frequency mixing in lithium niobate, generating a THz phonon-polariton wave whose electromagnetic component is coupled out to free space. The narrowband THz spectrum is tunable between 0.3-1.3 THz, with adjustable bandwidths generally less than 0.1 THz. At 10 Hz and 1 kHz repetition rates, 10 J and 1 J THz pulse energies are achieved, respectively, over a broad frequency range.

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