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Title:Terahertz Pulse Generation Using One-dimensional Photonic Crystals via Optical Rectification Effect
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Abstract:Generation in one-dimensional photonic crystals of a single-cycle terahertz (THz) pulse via the optical rectification effect was studied by using the Green's function method. The bandwidth and the carrier frequency of the generated THz pulse are, respectively, in the range 2-8 THz and 2-18 THz. By decreasing the duration of the input pulses these ranges can be enlarged, but pulse shape is also deformed. The results show that by setting the carrier frequency of the input pulse on the edges of the gap, the amplitude of the generated THz pulse is maximized and its bandwidth is narrowed, but for carrier frequencies located inside the gap the situation is reversed. Moreover, by adjusting the carrier frequency of the input pulse on upper gaps few-cycles THz pulses are generated.
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Inspec controlled terms:Green's function methods - optical pulse generation - photonic crystals
Uncontrolled terms:terahertz pulse generation - optical rectification effect - one-dimensional photonic crystals generation - single-cycle terahertz pulse - Green's function method - frequency 2 THz to 18 THz
Inspec classification codes:A4260F Laser beam modulation, pulsing and switching; mode locking and tuning - A4280W Ultrafast optical techniques - A4270Q Photonic bandgap materials - A0230 Function theory, analysis - B4330B Laser beam modulation, pulsing and switching; mode locking and tuning - B4110 Optical materials - B0220 Mathematical analysis
Numerical data indexing:frequency 2.0E+12 1.8E+13 Hz
Treatment:Practical (PRA); Theoretical or Mathematical (THR)
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