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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 2-8THz and 2-18THz. 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. © 2012 Copyright Taylor and Francis Group, LLC.

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