sample of 2 mm and is proportional to the sample length in all observable range. The value of splitting is independent on the incident power which confirms the optical linearity of the effect. For s-polarization of incident pulse the splitting value is 1.4 times less (theory) and 1.64 times less (experiment). This difference can be explained by different birefringence of materials of PhC layers. The porosity of PhC material gives a possibility to fill layers of the crystal with nonlinear substance (e.g. $NaNO_2$). Therefore nonlinear effects, such as selective focusing and compression can be observed in this structure.

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Spectral and temporal characteristics of resonant medium radiation excited at the superluminal velocity

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In the present work, spectral and temporal characteristics of the resonant medium radiation excited by an ultrashort light pulse propagating through the medium at the superluminal velocity are studied theoretically. The case is considered when the spatial density of atoms is modulated periodically along the direction of propagation of the superluminal excitation. The obtained results demonstrate that under the superluminal excitation in the linear case the spectrum of radiation of the medium, along with the fundamental frequency of the oscillators, possesses new frequencies that depend on the spatial frequency of oscillators' distribution and on the angle of observation. In nonlinear case, the solution of optical Bloch equations for two-level atom displays two short pulses of the medium radiation. The distance between two pulses in the time scale depends on the velocity of excitation and on the parameters of medium.

Optical pulse dynamics in case of the Laue scheme of Bragg diffraction in metamaterial photonic crystals

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We solve analytically the boundary problem of Bragg diffraction at the Laue scheme in a weakly modulated linear one-dimensional photonic crystal (PC) composed of metamaterial layers with the two-wave approximation. Contrary to conventional PCs, under certain conditions these structures display a new type of