temperatures from 240 to 480 °C;. It was established that vacuum annealing of the $Bi_{12}SiO_{20}$ crystals results in an increase of optical absorption for the range of 400 – 1100 nm. We observed after the subsequent annealing in the air atmosphere the reduction in the changes in the optical absorption for vacuum-annealed crystals. The changes in the optical absorption after irradiation at λ=1064 nm, which have been registered for conventional $Bi_{12}SiO_{20}$ samples, are not observed for ones annealed in vacuum. The observed spectral dependences are interpreted within the framework of the impurity absorption model taking into account both the photoexcitation of electrons from deep donor centers into the conduction band and the intracenter transitions.

The new principle of the all-optical streak camera based on ultrafast laser beam deflection by light-induced coherent photonic crystal

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In the present work the new principle of ultrafast laser beam deflection is proposed and investigated theoretically. This principle is based on the creating of the light-induced spatial grating of the resonant polarization and population difference with the depending on the time spatial period in the coherent resonant film. Coherent photonic crystal is created by ultra short pumping laser pulse with the periodic triangle-type spatial transversal profile of the amplitude. Numerical and analytical simulations have been performed using optical Bloch equations. It was shown that thin resonant film radiates the angular sequence of retarded ultra short pulses due to self-diffraction of the pumping pulse on the grating of polarization or due to the diffraction of the weak probe pulse on the grating of population difference, created by the pumping pulse.

Radial wave functions in variational improved WKB approximation

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The approximate radial wave functions for an arbitrary potential are constructed by means of explicit summation of the leading constituent WKB series with the help of varied power-law substitution. The optimal value of a variational parameter is found from the minimality condition for integral discrepancy. The proposed approach is applied to the modified Poschl-Teller potentials which can be used for adequate simulating a spherical quantum dot.