

# Control by a focussing of light beams at quasi-resonance acousto-optical interaction

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The nonresonance interaction of a light field with a ultrasonic wave reduces, as is known, to phase modulation of a wavefront of a light wave. Besides modification of a phase surface of a light field can appear. It excites effects of a focussing and undiffractive propagation of light beams. In the present paper the effects of undiffractive propagation and focussing of light beams are investigated in details at quasi-resonance diffraction on a ultrasonic wave in approximation of constant intensity. Acoustooptical focusing device on the base of crystal  $TeO_2$  is analytically and numerically are investigated The conditions of a focussing, focal length, angular aperture of a lens are found at acoustooptical interaction. The possibility of reorganization of it parameters with the help of reorganizations of frequency of ultrasonic wave is shown.

## Secondary electrooptical effect in superlattices

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Due to successes by creation of superlattice (SL) research of propagation of electromagnetic waves in such media is of great interest. Application of SL allows to combine useful properties of component of SL and also to expand functionality of devices due to the phenomena, impossible in monocrystals. The most general approach for research the light transformation in SL is to solve Maxwell equations and to take into account conditions on boundaries of layers. But thus, in most cases there is possible only a numerical analysis of processes.