frequencies of longitudinal ultrasonic wave 10 - 35 MHz the sizes of local areas were 100-350 microns. The dependencies of amplitude of AE-signals and the amplitudes of transmitted ultrasound on amplitude of ultrasound creating stress in a crystal have similar nonmonotoneous dependencies. Ther is a qualitative congruence between local minimums of amplitude of transmitted through a sample ultrasound and maximums of amplitude of AE. Thus, the magnification of amplitude of AE is caused by magnification of absorption of ultrasound.

References

[1] Greshnikov V.A., Drobot Y.B. Acoustic emission. Application for trials of materials and items.- M.: Standards, 1976.- 272 p. (Rus.)

[2] Kalitenko V.A, Kucherov I.Ya, Perga V.M., etc. // Fiz.Tverd.Tel. - 1987.- v.29, N 8.- p.2499-2501 (Rus.)

[3] Lyashenko O.V., Perga V.M. // Materials conf. " Dynamic problems of a mechanics of a continuous mediumE, Krasnodar, 1992, p.80. (Rus.)

[4] Lyashenko O.V. //Visnyk Kyiv Univ. - 1999.- N2.- p.473-477. (Ukr.)

The diffraction of Bessel's light beams on ultrasonic waves

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At present Bessel's light beams (BLB) are intensively investigated in optics. The specific feature of BLB is that a spatially confined BLB is characterized by an 'elongated' focus, i.e. by a suppressed diffraction divergence of the central part of the beam. These properties allow to use

a constant profile of a center BLB for longitudinal - homogeneous action of a radiation on substance and for a realization of nonlinear interactions. Besides the investigation of transformation of BLB in parametrical processes inside of optically anisotropic crystals is of interest. In the paper the interaction of BLB and the plane ultrasonic wave at the collinear interaction inside of the anisotropic crystal was investigated. The system of equations is obtained which describes process of acoustooptical diffraction. The effectiveness of a diffraction is calculated, also the dependence of diffraction effectiveness on number of diffracted modes is investigated. Is shown, that the diffracted BLB has orthogonal polarization and a conicity angle smaller, than at incident BLB. The possibility of using of the given type of interaction in acoustical filters is analysed.

Acoustooptical interaction of Bessel light beams

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The development of optics of Bessel's light beams (BLB) reduces to necessity of investigation of their transformation in processes acoustooptical (AO) interactions. In the present paper the collinear AO diffraction of BLB on the Bessel's acoustic beam (BAB) is considered. The system of equations which describes process of AO diffraction is obtained. The dependence the AO diffraction effectiveness on number of modes of BLB is found. In paper scalar and vectorial interactions of beams are considered. The angular width of a synchronism at AO interaction is defined. Is shown, that the distribution of intensity diffracted BLB in distant zone represents a ring. If the diameter of a ring of diffracted BLB is equal to a diameter of incident BLB, this case corresponds to scalar interaction of beams. The ring of a smaller diameter of diffracted BLB corresponds to vectorial interactions of beams. The possibility of using of the given type of interaction in AO filters is analysed.