The influence of nonlinear optical response nonlocality on elliptically polarized beam self-focusing in the isotropic phase of nematic liquid crystal.

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Diploma thesis abstract.

The propagation of elliptically polarized Gaussian laser beam in the nematic liquid crystal isotropic phase near the transition temperature to the mesophase was investigated within numerical simulation.

It was shown that taking into account the non-locality of the nonlinear optical response, regardless of its mechanism does not create a ring-shaped structure of the field during the propagation of the elliptically polarized light through a medium, the initial degree of beam ellipticity affects the change in angle of rotation of the polarization ellipse principal axes, in multi-foci mode the degree of ellipticity nonmonotonically varies depending on the thickness of the crystal, initial linearly polarized beam does not change its polarization on the elliptical during the propagation.

It was showed that an orientation mechanism of nonlocal response increase the polarization ellipse speed of rotation with a decrease in the correlation scale of a nematic liquid crystal.

For thermal mechanism nonlocal response complex nature of the change of intensity of the beam propagation in the medium was detected.