Annotation

Self-focusing of a light beam with an elliptic cross section in the isotropic phase of a nematic liquid crystal near the nematic–isotropic transition

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The present paper presents numerical investigation of the self-focusing of a light beam with elliptical cross-section in isotropic phase of nematic liquid crystal near the nematic-isotropic transition. Previous theoretical research of this issue showed high responsiveness of the self-focusing threshold to the polarization state of input beam and various regimes of its polarization dynamics were described. The complexity of interaction between circularly polarized components of the radiation can lead to the appearance of polarization singularities in certain cross-sections of propagating beam. In these points the radiation is fully circularly polarized. Polarization singularities are widely studied in linear optics, but their appearance in problems of nonlinear optics remains poorly investigated. In present paper special attention is devoted to those regimes of self-focusing in which the polarization singularities appear and their evolution dynamics was studied as well as its dependency of nonlinear medium parameters and the properties of the incident beam.