Polarization transformation of high-peak-power radiation in Kerr medium

Possibility of polarization singularities formation during the self-focusing of elliptically polarized Gaussian beam has been studied numerically and analytically. At the beginning of the self-focusing process, two areas appear in the cross-section of the beam. Energy flows towards the axis of the beam in the central one and in the opposite direction outside the area. At some distance, in the central area there appears a ring-shape area, where energy flows outside the beam. It area expands and merges with the peripheral area some distance away the border of the non-linear medium. At the circumference, corresponding to geometric place of their joining, a phase dislocation of the weak circularly polarized or, in other words, a *C*-lineforms. Breaking of axial symmetry of the beam leads to deformation of the *C*-line into a 3-dimentional line. Polarization singularities, namely *C*-points, are formed by transverse cross-sections of the distorted *C*-line.Addition of minor noise to the initial amplitude distribution do not affect qualitatively the picture of the process of *C*-points formation and evolution.