
The investigation of the features of focusing vortex super-Gaussian beams with a variable-height diffractive axicon

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Abstract

Spatial intensity distributions of the Laguerre-superGauss modes (1,0) as well as a super-Gaussian beam with radial and circular polarization were investigated versus changes in the height of a diffractive axicon. The height of the relief of the optical element varied from 0.25λ to 3λ . The modeling by a finite-difference time-domain method showed that variations in the height of the diffractive axicon significantly affect the diffraction pattern in the near field of the axicon. The smallest focal spot size for a super-Gaussian beam was obtained for radial polarization at a height equal to two wavelengths. The minimum size of the focal spot for the Laguerre-superGauss mode (1,0) was obtained for circular “-” polarization with an element height equal to a quarter of the wavelength.

Keywords: sharp focusing, FDTD, super-Gaussian beam, Laguerre-super Gauss modes (1,0), axicon.

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