

Analyzing the theoretical evolution behavior of Laguerre higher-order cosh-Gaussian beam propagating through liver tissue

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Abstract

We perform an analytical study on the propagation properties of Laguerre higher-order cosh-Gaussian beam (LhchGB) passing through liver tissue, utilizing the power spectrum refractive index and the extended Huygens-Fresnel integral. Our investigation includes numerical simulations based on the derived formula, illustrating how varying beam parameter configurations within liver tissue impact the properties of the beam. Additionally, we thoroughly discuss the influence of both optical parameters and biological tissue characteristics on the received intensity. Our observations indicate that the LhchGB undergoes changes in its shape as it traverses a considerable distance through this medium. The results presented in this paper hold significant importance for their potential applications in determining the deterioration or disruption of biological tissue, as well as in the fields of medical imaging and medical diagnosis.

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