

[Home](#) > [Optical and Quantum Electronics](#) > [Article](#)

# A detailed investigation of a Generalized Hermite cosh–Gaussian beam propagating in uniaxial crystals orthogonal to the optical axis

Published: 26 September 2023

Volume 55, article number 1080, (2023) [Cite this article](#)[Optical and Quantum Electronics](#)[Aims and scope](#) →[Submit manuscript](#) →

Faroq Saad Abdelmajid Belafhal

 83 Accesses 5 Citations [Explore all metrics](#) →

## Abstract

In this paper, we study the propagation properties of a Generalized Hermite cosh–Gaussian beam (GHGCB) in uniaxial crystals orthogonal to the optical axis. Analytical expression of the GHGCB at the receiver plane is derived using Huygens–Fresnel integration. Some analyses are investigated to illustrate the effect of variations in crystal refractive indices, source beam parameters and propagation distance on the beam intensity profiles. Results indicate that a GHGCB preserves its initial profile nearly invariant for a small propagation distance and evolves into an elliptical Gaussian-like beam surrounded by the smaller beamlets in the far field due the effect of the uniaxial crystal. The beam width and the intensity distribution of received beam can be controlled by adjusting the source beam parameters and the ratio of refractive indices of the crystal. We anticipate that our results obtained in this research will be useful for the control of optical particle.

### Access this article

[Log in via an institution](#) →[Buy article PDF 39,95 €](#)Price includes VAT (Iraq)  
Instant access to the full article PDF.[Rent this article via DeepDyve](#) [Institutional subscriptions](#) →

Sections

Figures

References

[Abstract](#)[Availability of data and materials](#)[References](#)[Funding](#)