



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



# Evolution properties of Laguerre higher order cosh–Gaussian beam propagating through fractional Fourier transform optical system

Published: 26 March 2024

Volume 56, article number 798, (2024) [Cite this article](#)[Faroq Saad](#), [Halima Benzehoua](#) & [Abdelmajid Belafhal](#)  94 Accesses  2 Citations [Explore all metrics](#) →

## Abstract

We theoretically investigate the propagation properties of a Laguerre higher order cosh Gaussian beam (LHOchGB) in a fractional Fourier transform (FRFT) optical system. Based on the Collins formula and the expansion of the hard aperture function into a finite sum of Gaussian functions, we derive analytical expressions for a LHOchGB propagating through apertured and unapertured FRFT systems. The analysis of the evolution of the intensity distribution at the output plane has shown from the obtained expressions, using illustrative numerical examples. The results show that the intensity distribution of the considered beam propagating in FRFT is significantly influenced by the source beam parameters and the parameters of the FRFT system. It is possible to demonstrate the potential benefits of the results obtained for applications in laser beam shaping, optical trapping, and micro-particle manipulation.

 This is a preview of subscription content, [log in via an institution](#)  to check access.