GENERALIZED $M^2$-FACTOR OF HARD-EDGED DIFFRACTED HYPERGEOMETRIC-GAUSSIAN TYPE-II BEAMS

A.A.A. Ebrahim, F. Khannous, H. Nebdi, A. Chafiq, A. Belafhal*
Laboratoire de Physique Nucléaire, Atomique et Moléculaire
Département de Physique, Faculté des Sciences, Université Chouaib Doukkali,
B. P.: 20, 24000 El Jadida, Morocco
* Corresponding author: E-mail: belafhal@gmail.com
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Abstract
Based on the truncated second-order moments definition, the generalized $M^2$-factor of the hypergeometric-Gaussian type-II beams in the cylindrical coordinate system through a hard-edged circular aperture is derived. The effects of the beam truncation parameter $\delta$ and the beam orders on the beam propagation factor have been investigated. The theoretical results show that the generalized $M^2$-factor can be simplified to four special cases, among of them, the truncated and untruncated Gaussian beams. The power fraction of the hypergeometric-Gaussian type-II beams is calculated analytically and illustrated numerically.

Keywords: Generalized $M^2$-factor; Hard-edged; Hypergeometric-Gaussian type-II beams; Power fraction.