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Tesis: "**THEORETICAL AND EXPERIMENTAL STUDY OF LENSES FOR OPTIMAL FOCUSING CONDITIONS OF GAUSSIAN BEAMS**"

Resumen:

In this thesis we present analytical equations that allow us to calculate with high accuracy complex amplitude distributions of monochromatic polarized or non-polarized Gaussian beams in a vicinity around a focal plane. We demonstrate if the distance of propagation of the beam between the laser source and the focusing lens varies, the best focusing planes also vary and also, the focusing conditions also vary. Our theoretical model is supported by calculating the propagated fields by means of the Fresnel diffraction integral and our numerical calculations are performed by means of a superposition of Gaussian wavelets using a technique denoted as the Fresnel Gaussian shape invariant (FGSI). We demonstrate that there is a especial focal length for focusing lenses that marks a difference between them and we denote this parameter as the delimiting focal length.