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Study on Refractive Index Distribution of the Square Self-Focusing Lens

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Abstract: In order to acquire the refractive index distribution of the square self-focusing lens, a semi-empirical method is reported. The diffusion equation's solution under the square boundary conditions is approximated by the solution under the circular boundary conditions. The four unknown coefficients of the approximate solution are acquired by the known refractive index of the square self-focusing lens, and the refractive index is obtained by Jamin interference method. The calculation result agrees well with the experimental data, the average value of the relative error is less than 0.3%.

Key words: Information optics; Refractive index distribution; Jamin interference; Square self-focusing lens

1. Introduction

Self-focusing lens is an important lens which has wide applications. It has been widely used in optical fiber communication, optical fiber sensor and optical information processing areas due to their advantageous characteristics, including large numerical aperture，short focal length, small diameter, cylindrical, small-spot focus and high imaging resolution[1]. Self-focusing lens combined with single mode fiber

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