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Focus introduction: Z-scan technique

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Highlights :

- Influence of sensitivity on Z-scan technology is investigated.
- The results reveal that the information of material NO comes from the beam edge.
- The accuracy of measurement is improved according to the changing state of beam.

Abstract: Since the introduction of the Z-scan, which is widely used to measure the nonlinear optical properties of material. The result of measurement mainly depends on light through the sample after a slight variation in the intensity, and the tiny change depends on the accuracy of the measurement sensitivity of Z-scan technology. Measurement scheme of the optical signal for nonlinear characterization and transmission beam design can improve the sensitivity of Z-scan technique.

Keywords: Nonlinear optics; Z-scan technique; Sensitivity; Gaussian beam

1. Introduction

As is known to all, the Z-scan technique devised by Sheik-Bahae et al. [1, 2] has been widely used to measure the nonlinear optical properties of material, due to its simplicity and high sensitivity. During a Z-scan measuring process, the nonlinear optical information could be obtained by moving samples, making the relative change of focus position of scanning beam waist to measure the laser normalized transmittance in far-field. The factor is particularly important for nonlinear optical characterization, where relatively small intensity-dependent modifications in refraction and absorption must be transferred

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