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Beam Shaping Based on Axisymmetric Aspheric Mirrors

摘要

平顶光束因其能够在照射区域内提供均匀的光强分布，广泛应用于科学研究与工业领域。本研究提出一种基于两片轴对称非球面反射镜（axisymmetric aspheric mirrors, AAMs）、偏振分光器及两片四分之一波片的反射式激光光束整形方法，用以将高斯光束转换为平顶光束。与其他光束整形方法相比，基于 AAMs 的整形方案在能量利用效率和输出平行光束的能力方面具有显著优势。

关键词

光束整形；非球面反射镜；高斯光束；平顶光束

Abstract

Flat-top beam, known for its ability to generate a consistently even irradiation area, holds vast utility in many fields of scientific and industrial applications. In this paper, a reflective laser beam shaping method based on two axisymmetric aspheric mirrors (AAMs), a polarizing beam splitter (PBS) and two quarter wave plates (QWPs) is proposed to transform Gaussian beam into flat-top beam. Compared to alternative beam shaping methods, the method using AAMs demonstrates distinct advantages on notably high energy efficiency and unique capability to generate parallel beams. Thanks to its relative simplicities of design, manufacture and tunability, AAMs-shaping further enhances its appeal in applied research scenarios.

Keywords

beam shaping; aspheric mirror; Gaussian beam; flat-top beam

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