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**论文****光纤耦合激光束输出光空间分布及其影响因素分析**

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**摘要:**

通过分析光纤出射端面的光强分布,研究了光纤传输过程中激光二极管出射光束进入光纤时的指向角对出射端面光场分布的影响,提出一种影响光纤输出端光场的新因素,对数值孔径和光纤芯径两个影响因素进行了补充。在光纤传输过程中,将激光二极管出射的光束等效为大量光线,在二极管输出光的位置以及空间分布确定的情况下,使用光线追迹方法依次分析了单束和多束光的指向角以及光纤长度对出射面光强分布的影响。结果显示:单束入射光指向角的偏差会引起光纤输出端面光强极值位置的偏移,多束的情况可以导致光纤输出端光强呈现明显的环状分布,得出了入射光束指向角的偏差是影响光纤出射面光强分布和峰值位置的重要因素的结论,而光纤长度的变化对上述分布状况同样存在影响。

**关键词:** 激光器 固体激光器 光纤传输 光线追迹法 指向角**Light Intensity Distribution of Fiber-coupled Laser Beam and Analysis of Impact Factors**

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**Abstract:**

Based on analysis of light intensity distribution over exit face,effects of direction angle of laser beam on exit optical field distribution were investigated during transmission process through optical fiber.A new influencing factor was proposed,which was a complement to the two proverbial factors-numerical aperture and core diameter of the optical fiber.Beams of laser diode were resolved into a large amount of ray during transmission process.On the condition of a constant entrance optical field distribution,influences of single beam and multi-beam direction angle and optical fiber length were analyzed by ray tracing method.Results indicate that,in optical fiber,deviation of a single beam direction angle can lead to extremum position excursion on the exit face,while with more beams,deviation of direction angle can bring about an obvious ring form light intensity distribution.It can be concluded that direction angle of a beam is an important factor which influences the light intensity distribution and extremum position over the exit face,and the length of optical fiber also takes effect.

**Keywords:** Laser Solid-state laser Optical fiber transmission Ray tracing method Direction angle

收稿日期 2011-02-14 修回日期 2011-05-13 网络版发布日期 2011-08-25

**DOI:** 10.3788/gzxb20114008.1205**基金项目:**

国防预研基金资助项目 (No.9140A02010106XXXXXX) 资助

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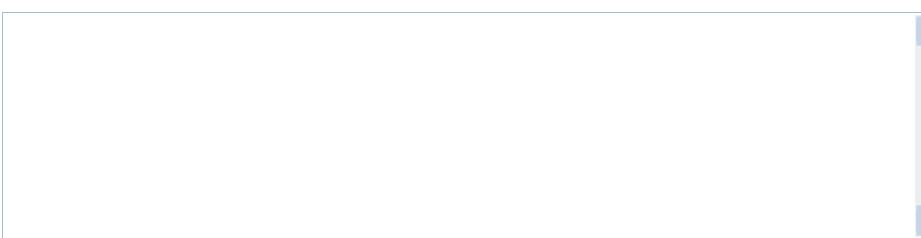
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