

激光物理与激光器件

一种激光二极管像散光束准直整形方法研究

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摘要:

为了准直并整形具有像散的激光二极管光束,采用高斯光束 q 参量变换规律,推导了利用柱面自聚焦透镜整形激光二极管光束应满足的条件,并在此基础上,通过软件模拟优化,得到了一套效果良好的光束整形准直系统。经过准直整形后光束快慢轴方向发散角基本相等,均小于 0.7mrad ,束腰位置差异小于 2.8mm 。结果表明,系统中柱面自聚焦透镜的应用起到了较好的效果,准直整形后的光束具有发散角较小且旋转对称等特点。

关键词: 激光器 准直整形 柱面系统 自聚焦透镜

Shaping and collimation of LD beam with astigmatism

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Abstract:

In order to collimate and shape the LD beam with astigmatism, the mathematic condition for LD beam shaping with a cylindrical gradient-index lens was introduced applying $ABCD$ law. Based on this, a system with good effect was got through software simulation. After collimation and beam shaping, the beam in fast and slow axis has the same divergence angle which is less than 0.7mrad and the beam waist difference in z axis is less than 2.8mm . The result shows a good effect was obtained with a cylindrical gradient-index lens in this system. Under the condition of beam shaping and collimation, the LD beam has the characteristics of small divergence angle and rotationally symmetry.

Keywords: lasers collimation and shaping cylindrical system gradient-index lens

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