

激光技术

激光空间相干合成效果评价方法的研究

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摘要:

根据目标上实际最大光强与理想合成效果下最大光强的比值定义了合成效果因子,用以评价相干合成效果。在此基础上研究了影响相干合成效果的主要因素,并对合成效果因子的传输特性进行了研究。结果表明:阵列紧密程度对合成效果影响不大,在较小的空间占空比下有可能得到较好的合成效果。影响合成效果的主要因素是随机相位差,当随机相位差增大到一定程度时,光束合成其实已经由相干合成过渡到了非相干合成,得不到预期的相干合成效果;随着传输距离的增大,空间占空比对合成效果因子的影响将进一步减小,影响合成效果的主要因素之一是随机相位差。

关键词: 激光器阵列 相干合成 合成效果 影响因素 传输特性

AEvaluation of spatial coherent combination of laser beams

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Abstract:

The combination effect was evaluated by combining effect factor defined as the ratio of actual maximum light intensity to the ideal combined light intensity at the target. On this basis, the main factors affecting combination effect and the propagation property of combination effect factor were studied. Good combination effect could be obtained with a small duty ratio, while the main factor influencing the combination effect is the random phase errors, because the beam combination has actually become incoherently combined when the random phase errors are greater than a specific value. With the increase of the propagation distance, the influence of the duty ratio on combination effect becomes smaller, and one of the main factors influencing combination effect is random phase errors.

Keywords: lasers array coherent combination combination effect influencing factors propagation property

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