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论文

# LDA侧面抽运棒状激光器热透镜效应的有限单元法分析

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摘要：

建立了激光二极管阵列端面抽运棒状激光介质的数值模型.考虑到介质与空气的对流换热和介质的热力学参量随温度的变化,根据经典热传导方程和热弹性方程,运用有限单元法,得出了棒状介质内瞬态温度、热应力和应变的分布.分析了热透镜焦距随抽运功率的变化规律,所得的规律与有关文献相符合.理论分析结果可为激光二极管阵列抽运固体激光器的结构优化设计和实验提供理论参考.

关键词： 棒状激光器 激光二极管阵列端面抽运 温度分布 热应力分布 应变分布 有限单元法 热透镜效应

# Finite Element Method Analysis on Thermal Lens Effect of the Rod Laser End-pumped by LDA

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Abstract:

A numerical model of the rod laser medium end-pumped by laser-diode array (LDA) is set up.Under considering the influence of temperature correlation of the thermodynamic parameters of the material and heat transfer coefficient between air and medium,based on the thermal conduction equations and the thermal-elastic equations,the transient

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distributions of temperature and thermal stress and strain in the rod medium are calculated by a finite element analysis method.The influence disciplinarian of the pump power on thermal lens focal length in the medium is analyzed.The theoretical results accord with interrelated experiment and provide theoretical reference for the design of solid laser pumped by LDA and experimental study.

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