



Optica Applicata 2006(Vol.36), No.2-3, pp. 339-349

Application of spatially resolved thermoreflectance for the study of facet heating in high power semiconductor lasers

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Keywords

thermoreflectance, semiconductor lasers

Abstract

We have developed a new technique for monitoring the facet heating in semiconductor lasers and for correlating these measurements with the performance and reliability of the device. The method is based on thermoreflectance, which is a modulation technique relying on periodic facet temperature modulation induced by pulsed current supply of the laser. The periodic temperature change of the laser induces variation of the refractive index and consequently modulates the probe beam reflectivity. The technique has a spatial resolution of about $1 \mu\text{m}$ and temperature resolution better than 1 K, and can be used for temperature mapping over a $300 \mu\text{m} \times 300 \mu\text{m}$ area. It can be applied to any kind of edge emitting lasers or laser bars. The technique is crucial for understanding the thermal behavior of a device.



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