

SAIP2014



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Thermally induced lensing determination from the coefficient of defocus aberration

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Abstract :

The effects of lensing due to a temperature gradient in a laser crystal as a result of an end-pumped configuration in a solid-state laser resonator were investigated. It is well known that as the result of thermally induced lensing, the effective length of a laser cavity is altered, thus altering the properties of the selected mode at the output of the laser. Typically, the radius of curvature of a lens may be described from the coefficient of the defocus aberration, which can be described from the set of orthogonal Zernike polynomials. The defocus coefficient of known lenses (physical and digital) was measured using a Shack-Hartmann wave-front sensor, as a calibration technique. With this we probe a Nd:YAG gain medium with a collimated Gaussian beam operating at 633 nm and the coefficient of the defocus aberration under active pumping at a variety of pump powers was measured. The position of measurement inside the crystal is varied relative to the end-pumped surface and the resulting focal lengths are compared to typical thermal lens measured data in active end-pumped solid-state lasers.

Award :

Yes

Level :

PhD

Supervisor :

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Paper :

No

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