

SAIP2014



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Improving the laser brightness of a commercial laser system

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Abstract :

We explore a beam shaping approach inside a laser cavity to generate a Gaussian distribution by the metamorphosis of a Gaussian beam into a flat-top distribution on opposing mirrors. The concept is tested external to the laser cavity through the use of two spatial light modulators (SLMs), where the first SLM is used to transform a Gaussian beam into a flat-top distribution and the second SLM is encoded with the conjugate phase of the flat-top for conversion back to a Gaussian. We implement this intra-cavity selection through the use of two optical elements of the refractive variant that are designed from the phase profiles addressed to the SLMs. We consider a solid-state diode side-pumped laser resonator that consists of two planar mirrors where the refractive optics are positioned at the mirrors. We out couple the Gaussian and flat-top distributions and we show that we increase the energy extraction while maintaining a beam quality that is comparable to our predictions.

Award :

Yes

Level :

PhD

Supervisor :

Prof Andrew Forbes, aforbes1@csir.co.za, CSIR

Paper :

No

Primary authors : Mr. NAIDOO, Darryl (CSIR)

Co-authors : Dr. LITVIN, Igor (CSIR) ; Prof. FORBES, Andrew (CSIR)

Presenter : Mr. NAIDOO, Darryl (CSIR)

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