

SAIP 2011



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Generation of a Laguerre-Gaussian TEM₀₁ mode in a monolithic microchip laser

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Content :

We explore a method in the selection of a specific higher-order mode through judicious shaping of the pump light to create a high modal overlap with the desired mode. To demonstrate this principle, we create a donut-shaped pump profile in the focal plane of a converging lens by use of a beam shaping element. This pump profile is used to longitudinally pump a monolithic microchip laser and a plano-concave resonator cavity where we achieve a TEM₀₁ output with powers of ~12 mW and ~14 mW at slope efficiencies of 17% and 21% respectively. In both cases the modal purity is high with a beam quality factor of ~2. Diffractive pump shaping of this form is advantageous as it allows for high pump intensity even with low pumping powers, thus ensuring sufficient gain is achieved for laser oscillation.

Level (Hons, MSc, PhD, other)? :

MSc

Consider for a student award (Yes / No)? :

Yes

Short Paper :

No

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