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Improving the laser brightness of a commercial laser system

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Abstract

We investigate the selection of a flat-top beam and a Gaussian beam inside a laser cavity on opposing mirrors. The concept is tested external to the laser cavity in a single pass and double pass regime where the latter mimics a single round trip in the laser. We implement this intra-cavity selection through the use of two 16 level diffractive optical elements. We consider a solid-state diode side-pumped laser resonator in a typical commercial laser configuration that consists of two planar mirrors where the DOEs are positioned at the mirrors. We out couple the Gaussian and flat-top distributions and we show that we improve the brightness of the laser with active mode control. We also demonstrate that the quality of the beam transformations determine the brightness improvement.