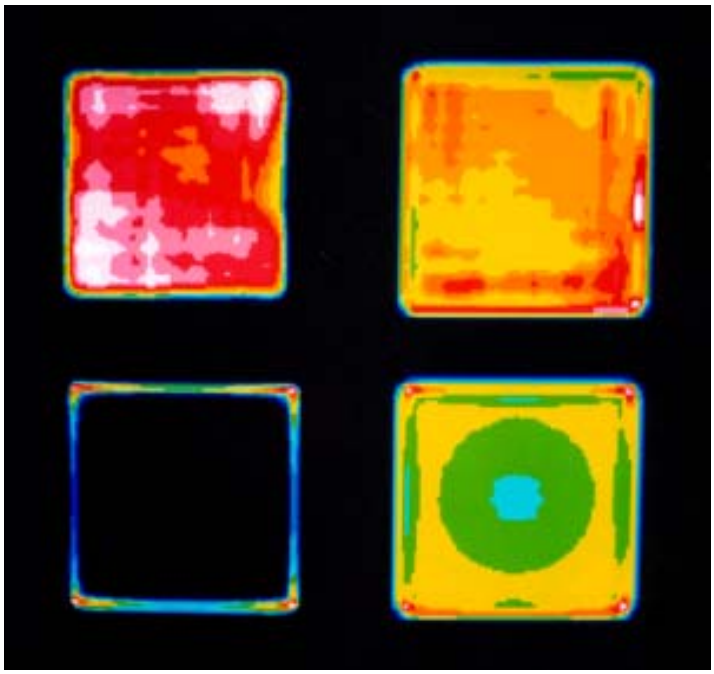
About the Cover:

Optical parametric chirped-pulse amplification (OPCPA) has been shown to be well suited for front-end amplification in petawatt-class laser systems. The cover photograph shows Research Engineer Mark Guardalben and Cornell undergraduate (and an alumnus of the 2001 LLE Summer High School Research Program) Joshua Keegan reviewing results from the simulated response of an optical parametric amplifier (OPA). The numerical model used to generate these images is described in this issue and is currently being used to design the OPCPA front end for the OMEGA EP high-intensity, short-pulse laser.



The photo on the left shows the computer screen from the cover photo. The images show examples of how an OPA pump beam is depleted and the need to properly match the spatial and temporal properties of the pump and seed beams to extract the maximum amount of energy from the pump beam. Upper left: A temporally integrated spatial cross section of the input pump beam—a tenth-order super-Gaussian with randomly distributed Gaussian noise. Upper right: The depleted pump beam using a seed beam that has a tenth-order super-Gaussian spatial-intensity distribution without noise. Lower right: A depleted pump beam using a spatially Gaussian seed beam; the pump is preferentially depleted in the center. Lower left: A depleted pump beam that has been thresholded at its 50% intensity level to reveal the residual pump energy at the edge of the beam. As discussed in the article, proper pump- and seed-beam size matching enhances the extraction of the pump beam's energy at the edges of the beam.

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