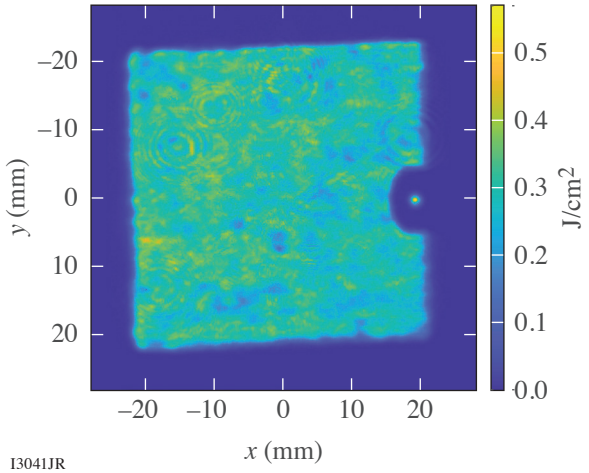
About the Cover:

The cover photo shows M. Spilatro and B. Webb installing a vacuum-compatible SPIDER diagnostic into the MTW-OPAL (Multi-Terawatt optical parametric amplifier line) grating compressor chamber for temporal pulse measurements at full power. MTW-OPAL is a mid-scale femtosecond laser built using optical parametric chirped-pulse amplification; the MTW laser pumps the final parametric amplifier. Just as MTW was a technology development and demonstration platform for the front end of OMEGA EP, MTW-OPAL is intended as a development and proof-of-concept laser for the future EP-OPAL (OMEGA EP-pumped optical parametric amplifier line—a femtosecond-kilojoule laser at LLE's Omega Laser Facility. The inset shows the time-domain reconstruction of the amplified and compressed pulse as measured by the SPIDER diagnostic. First Light Campaign results demonstrated >7-J pulse energies with pulse durations <20 fs.

Large-aperture (>few-cm) noncollinear optical parametric amplifiers (NOPA's) are being developed using deuterated potassium dihydrogen phosphate (DKDP) crystals due to the large bandwidth supported by these crystals and potential for scaling to several tens of centimeters in aperture size. NOPA5, the final amplifier on MTW-OPAL, produces a 45 × 45-mm^2 profile with 11-J pulse energy and >150-nm bandwidth (full width at 10%). The image to the right shows the near-field profile measured after NOPA5, with a peak-to-mean ratio of 1.4:1. The cutout is from a sampling mask used to extract a small portion of the beam for measurement with the SPIDER diagnostic.



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Ultra-broadband transport optics, compressor gratings, and diagnostic tools compatible with EP-OPAL are an active area of development currently being explored using MTW-OPAL. The MTW-OPAL First Light Campaign concluded with a successful demonstration of 0.35-PW peak power. Next steps include developing hardware and techniques for *f*/2 focusing with a deformable mirror and double plasma mirror system to achieve ultrahigh-contrast focused intensities >5 × 10^{21} W/cm^2.

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