

## PRECISION HIGH-ENERGY-DENSITY SCIENCE AT THE OMEGA LASER FACILITY

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The Omega Laser Facility consists of two coupled laser systems—the 60-beam OMEGA laser completed in 1995 and the four-beam OMEGA EP (enhanced performance) laser completed in 2008. The OMEGA Laser is capable of producing up to 30 kJ of ultraviolet (UV) light in a temporally shaped pulse up to 3.8-ns duration. The OMEGA EP laser can be operated with four long-pulse beamlines that can produce 6.5 kJ of UV energy each in a temporally shaped pulse up to 10-ns duration and/or with two high-energy petawatt beamlines with energies of 2 kJ in a 10-ps laser pulse. The OMEGA laser nominally performs 11 target shots per day and the OMEGA EP laser six. Both lasers are outfitted with an extensive suite of optical, nuclear, and x-ray diagnostics. Experiments can be conducted with optical, x-ray, and particle probes. Externally applied magnetic fields with nominal values of 10 T over cm-scale plasmas are routinely employed. The OMEGA laser can be used to perform cryogenic direct-drive target implosions and other cryogenic experiments. External users perform more than 60% of the facility's target shots.

This talk will describe some of the Omega Laser Facility's capabilities and the work that goes on continuously to improve them. Many of the capability improvements are driven by requests from the Omega Laser Facility Users Group.

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