

About the Cover:

The Multi-Terawatt (MTW) Laser Facility supports small-scale target-physics experiments (see **High-Intensity Laser–Plasma Interactions in the Refluxing Limit** on p. 1 and **A High-Resolution Optical Transition-Radiation Diagnostic for Fast-Electron Transport Studies** on p. 9), as well as laser- and target-diagnostic development for OMEGA EP. Fusion Science Center for Extreme States of Matter and Fast-Ignition Physics postdoctoral fellow Philip Nilson (left) and The Institute of Optics graduate student Michael Storm (right) prepare the optical transition-radiation diagnostic (TRD) for operation. The optical TRD can be seen through an open chamber port focused on a spherical alignment target at the center of the target chamber. The MTW laser pulse arrives from the grating compressor chamber (highlighted in red in the background) via a vacuum transport tube and turning mirror assembly located inside the target chamber next to the optical TRD. The beam is focused by an $f/2$ off-axis parabolic mirror opposite the optical TRD (not visible). The nose of a single-hit x-ray spectrometer located 23° from target front-surface normal is seen at the lower left-hand side of the port.



Shown is a broader view of the MTW target area where Philip Nilson is aligning the target as viewed on a computer monitor, while Michael Storm is preparing an on-shot laser-temporal diagnostic. A long collimation tube attached to the MTW target chamber supports a charge-coupled-device (CCD) camera (not visible) operating as an x-ray spectrometer in the single-photon-counting mode. Movable lead shielding protects an adjacent area from high-energy x rays produced during some target shots.

This report was prepared as an account of work conducted by the Laboratory for Laser Energetics and sponsored by New York State Energy Research and Development Authority, the University of Rochester, the U.S. Department of Energy, and other agencies. Neither the above named sponsors, nor any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, mark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by

the United States Government or any agency thereof or any other sponsor. Results reported in the LLE Review should not be taken as necessarily final results as they represent active research. The views and opinions of authors expressed herein do not necessarily state or reflect those of any of the above sponsoring entities.

The work described in this volume includes current research at the Laboratory for Laser Energetics, which is supported by New York State Energy Research and Development Authority, the University of Rochester, the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302, and other agencies.

Printed in the United States of America

Available from

National Technical Information Services

U.S. Department of Commerce

5285 Port Royal Road

Springfield, VA 22161

Price codes: Printed Copy A04

Microfiche A01

For questions or comments, contact Jonathan D. Zuegel, Editor, Laboratory for Laser Energetics, 250 East River Road, Rochester, NY 14623-1299, (585) 275-4425.

Worldwide-Web Home Page: <http://www.lle.rochester.edu/>