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# National Laser Users' Facility News

## Management and Operations

Several important changes were made to the National Lasers Users' Facility (NLUF) management and operations during the 1997 fiscal year:

### 1. Proposal Submission Schedule

In coordination with the Department of Energy the proposal review schedule was advanced by three months. DOE will now issue calls for proposals sometime near the end of the calendar year, and the proposals will be reviewed in May of the following year. This will allow the principal investigators to receive information on the disposition of their proposals in sufficient time to make plans for the subsequent fiscal year.

### 2. Research Areas

In keeping with the NLUF Steering Committee's recommendation, DOE approved an expansion of research areas to include nearly all aspects of high-energy-density science.

### 3. NLUF Users' Guide

A new NLUF Users' Guide was produced and distributed. The new guide has enhanced descriptions of the OMEGA laser facility and its capabilities to assist prospective users with the development of their proposals.

### 4. NLUF Web Page (<http://www.lle.rochester.edu/pr/nluf.html>)

An enhanced NLUF home page was implemented that contains an on-line version of the NLUF Guide. Also available on the LLE web page for NLUF users is the annual OMEGA facility schedule. In addition, a complete diagnostic database is available via the LLE Home Page to approved users.

### 5. DOE Grants Program

Coordination between the NLUF and the newly formulated DOE Grants Program was established.

### 6. Users Questionnaire

Based on a recommendation of the NLUF Steering Committee, a users questionnaire was established to solicit input from facility users to continually improve NLUF operations.

### 7. FY98 Proposals

Eleven proposals, with funding requests totaling \$1,371,593, were submitted for FY98 work. This is the largest number of proposals submitted since 1991.

## Progress in Current Programs

Users funded under FY96 and FY97 grants continued to make progress on their research:

Hans Griem, Ray Elton *et al.* (University of Maryland) completed their FY96 work with a series of OMEGA shots taken in September 1996 and submitted a final report. They have continued their FY97 work and have taken two series of runs on OMEGA during this year. One of the goals of their experiments has been to measure the electric field in the laser-produced plasma at early times using satellites-to-forbidden line ratios in the extreme ultraviolet region. The inferred electric fields from these measurements are consistent with estimated values of the laser irradiance. Several publications and reports were produced on these experiments.

John Seely (Naval Research Laboratory) continued to make progress on obtaining time-resolved, hard- and soft-x-ray images of laser-irradiated targets (see Fig. 72.44). Time-resolved, soft-x-ray images of targets were obtained with a microscope and compared to hard-x-ray images obtained with filtered x-ray pinhole cameras. Recently Dr. Seely's work has focused on extending these results to four different energy regimes with the same instrument. Theoretical modeling is planned to compare the images with the expected laser irradiance uniformity.

Joseph J. MacFarlane (University of Wisconsin) has begun soft-x-ray tracer diagnostic experiments on hohlraums on the Nova laser. When this experiment was originally proposed, no other hohlraum experiments had been conducted on the OMEGA laser, so the NLUF Steering Committee recommended that Dr. MacFarlane's experiments be coordinated with the national laboratories and begun on the Nova laser. A proposal from the same group for FY98 has since been submit-

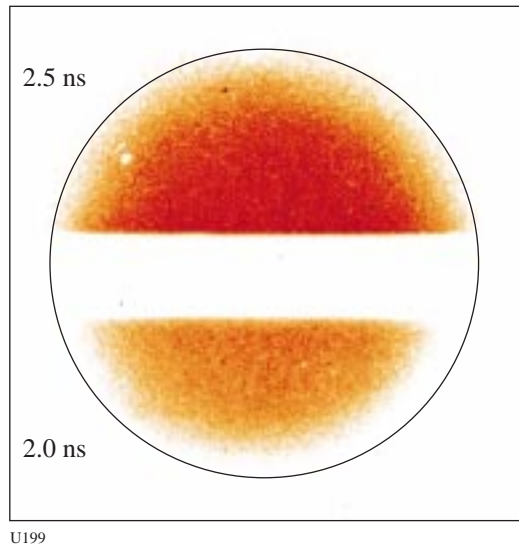


Figure 72.44  
Monochromatic soft-x-ray image (257-eV energy) of the emission from the focal spot of six overlapping OMEGA beams without SSD beam smoothing. The emission is uniform on a spatial resolution scale of  $10\ \mu\text{m}$ . The image was formed by a multilayer microscope and was recorded on two striplines of a gated framing camera 2.0 and 2.5 ns after the rise of the pulse.

ted to NLUF and accepted for indirect-drive experiments on the OMEGA laser.

Charles Hooper (University of Florida) completed during the past year the experiments called for in his FY96 grant and has completed planning for the FY97 work. In experiments conducted in March 1997, a density-dependent shift of spectral lines is indicated. Time-resolved comparisons of *K*-shell Ar and *L*-shell Kr lines were completed, and diminution and subsequent recovery of broadband emission were observed (using time-resolved x-ray spectroscopy) near the stagnation

time of imploded targets. Dr. Hooper's follow-on experiments require the use of full 2-D SSD with phase plates and thus are scheduled to be conducted in FY98 when a full complement of phase plates will be available on OMEGA.

Paul Drake (University of Michigan) began experimental design work for long-scale-length plasma experiments to be conducted on OMEGA. Software is being developed to manage the data to be produced in these experiments, and instrumentation is under development to conduct Thomson-scattering experiments on long-scale-length plasmas.

Qichang Su (Illinois State University) has continued collaboration with LLE scientists on analysis of x-ray spectra from imploded capsules. The work has so far produced four papers on diagnostics for high-density implosions.

Stephen Padalino (SUNY Geneseo) carried out a pilot project to compare the neutron yield [produced in  $T(d,n)^4\text{He}$  reactions] as measured by aluminum activation to that measured by copper activation.

#### FY98 Proposal Review

The NLUF Steering Committee met on 13 May 1997 to review proposals submitted for FY98. The Steering Committee members in attendance were Drs. Michael Cable (Lawrence Livermore National Laboratory), Allan Hauer (Los Alamos National Laboratory), Ramon Leeper (Sandia National Laboratory), Kevin McGuire (Princeton Plasma Physics Laboratory), John Soures (NLUF Manager), and Prof. Tudor Johnston (Institut National de la Recherche Scientifique). Eleven proposals were submitted to DOE for consideration as NLUF research during FY98. The committee carefully reviewed all proposals and approved for funding the eight proposals listed in Table 72.XII.

Table 72.XII: Approved FY98 NLUF Proposals.

Principal Investigator	Affiliation	Title of Proposal
H. Griem	University of Maryland	Early-Time Measurements of Laser-Plasma Conditions in OMEGA-Upgrade ICF Targets.
Q. Su	Illinois State University	Measurement of High Ion Temperature Using the Doppler Width of the Kr He $\beta$ Line (0.8 Å) from Kr-doped Target Implosions.
S. Padalino	SUNY Geneseo	Neutron Yield Measurements via Activation Diagnostics.
S. Padalino	SUNY Geneseo	Measurements of Core Conditions, Implosion Symmetry, and Anomalous Acceleration Mechanisms on OMEGA through Charged-Particle Spectrometry.
R. Petrasso	Massachusetts Institute of Technology	Measurements of Core Conditions, Implosion Symmetry, and Anomalous Acceleration Mechanisms on OMEGA through Charged-Particle Spectrometry.
J. MacFarlane	University of Wisconsin, Madison	Development of X-Ray Tracer Diagnostics for Radiatively Driven Ablator Experiments.
J. Seely	Naval Research Laboratory	Beam Uniformity Determination by Multi-Thermal Soft-X-Ray Imaging.
C. Hooper	University of Florida	Time-Resolved X-Ray Spectroscopy of Imploded Gas-Filled Microballoons: Systematic, Quantitative Comparison with Nuclear Diagnostics and Investigation of Line Shifts, Continuum Lowering, and Opacity.