

Section 4

NATIONAL LASER USERS FACILITY NEWS

This report covers the activities of the National Laser Users Facility (NLUF) during the quarter April to June 1981. During this period the NLUF Steering Committee met to review and rank user proposals. Six of the 21 proposals were accepted for experiments at LLE bringing us to a total of 12 user experiments. We have started user experiments for two groups and during the next quarter will begin a third experiment. Also during this quarter we have continued the planning of implementation of each experiment with out facility and participated in a scientific meeting to acquaint potential users with opportunities for user experiments.

The second NLUF Steering Committee met on April 28 to review and rank proposals, and to recommend funding of approved proposals to the Department of Energy. The committee consisted of scientists from a broad range of areas, including laser fusion, atomic physics, plasma physics, astrophysics, and materials research. The committee membership consists of:

Brian J. Thompson, Chairman, Dean, College of Engineering,
University of Rochester.

Thomas C. Bristow, Secretary (non-voting), NLUF Manager

David T. Attwood, Laser Program, Lawrence Livermore
National Laboratory

Michael Bass, Center for Laser Studies, University of
Southern California

Manfred A. Biondi, Department of Physics, University of Pittsburgh

Donald L. D. Caspar, Rosenstiel Research Center, Brandeis University

Lamar W. Coleman, Laser Program, Lawrence Livermore National Laboratory

Gordon P. Garmire, Department of Astronomy, Pennsylvania State University

Hans R. Griem, Department of Physics, University of Maryland

The committee approved 6 of 21 proposals for user experiments. These experiments are in the areas of phase separation and transition studies of materials using nanosecond x-ray probing; wavelength scaling of the two plasmon decay and stimulated Raman scattering instabilities in laser plasma experiments; a study of the wavelength shifts and spectral broadening of carbon (CVI) Balmer Series Lines; measurements of high resolution spectra in the region of 8 to 780 Å; and a study of opacity effects on line radiation in pellet implosions. These new user experiments are from the following investigators:

1. Mark Sceats (University of Sydney, Australia) – with two experiments.
2. Francis Chen and Chan Joshi (UCLA) and Nizarali Ebrahim (Yale University).
3. Hans R. Griem and J. Adcock (University of Maryland).
4. Uri Feldman and George Doschek (Naval Research Laboratory) and W. E. Behring (Goddard Space Flight Center).
5. C. F. Hooper, Jr. (University of Florida).

These new experiments bring us to a total of 12 users. We are just beginning experiments with the first 6 users and are looking forward to successful experiments with our next group.

We have started experiments with two of our users. Larry Knight and James Thorne from Brigham Young University have started experiments using multi-layer crystals to record the x-ray spectrum from laser produced plasmas. The first part of their experiment was to calibrate these crystals using the Stanford Synchrotron Facility. The next phase has started with target experiments on OMEGA and GDL (the multi-layer crystals are supplied by Troy Barbee of Stanford University). This research is supported by the Department of Energy.

The second user group that has begun experiments is from the University of Rochester. Jim Forsyth and Robert Frankel have been using the x-rays from a laser produced plasma for biological, molecular, and structural kinetic experiments. Successful protein diffraction patterns have been obtained with a new camera system and with 0.35 μm laser radiation. To date, 20-25 joules of

0.35 μm laser have been on target with total x-ray yields of 10^{14} photons per shot (at a wavelength of 4.45Å). Additional details of this research can be found in Volume 3 of the LLE Review (March-May, 1980). This research is supported by the National Science Foundation and the National Institutes of Health. An additional experiment has been x-ray laser development. Repetition of previous experiments with 0.35 μm laser radiation has shown somewhat higher inversion densities than obtained with 1.05 μm radiation.¹ This research is supported by the Air Force Office of Scientific Research.

The NLUF was represented at the Conference on Lasers and Electro-Optics (CLEO) in Washington, DC. An NLUF booth was used to explain the research possibilities and mechanisms for proposal review and acceptance. The presentation attracted a great deal of interest and discussion among visitors to the exhibit. This same format will be used at the American Physical Society Plasma Physics Meeting in New York City from October 13-15.

Further information on the NLUF is available by writing to:

Dr. Thomas C. Bristow
Manager, National Laser Users Facility
Laboratory for Laser Energetics
University of Rochester
250 East River Road
Rochester, NY 14623

REFERENCES

1. V. A. Bhagavatula and B. Yaakobi, *Opt. Comm.* **24**, 331 (1978).