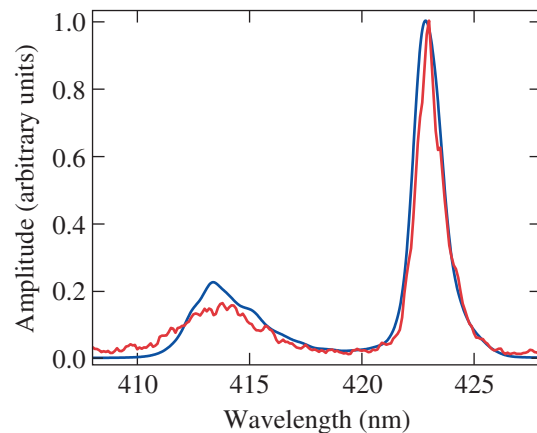


About the Cover:

The photo on the cover shows Physics and Astronomy graduate student R. K. Follett who reports on the direct observation of electron plasma waves driven by multibeam two-plasmon decay (TPD) using ultraviolet Thomson scattering. In inertial confinement fusion experiments, the TPD instability has the potential to generate large-amplitude electron plasma waves that accelerate electrons to high energies. In these experiments, Thomson scattering provides a measure of the electron plasma wave amplitudes responsible for accelerating the electrons. Simulated Thomson-scattering spectra from 3-D numerical solutions of the extended Zakharov equations of TPD are in excellent agreement with the experimental spectra. The cover background is Thomson-scattering spectra from an experiment, where five laser beams were focused onto a planar target.

Recent theories and modeling have suggested that when multiple laser beams are used, their interactions with electron plasma waves can be synchronized by phase coupling to common decay waves. The figure shown here illustrates a longer-wavelength feature that is the direct observation of TPD waves driven by multiple laser beams. The shorter-wavelength peak corresponds to electron plasma waves generated by the Langmuir decay of backscattered TPD waves. The numerical Thomson-scattering spectra (blue curve) calculated by the 3-D fluid code *LPSE* show excellent quantitative agreement with the measured spectra (red curve). This is an encouraging result, demonstrating that *LPSE* includes the relevant physics to capture the TPD-driven electron plasma wave amplitudes. *LPSE* has recently been extended to use these wave amplitudes to calculate the hot-electron spectrum.



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-NA0001944, 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
www.ntis.gov

For questions or comments, contact Dustin H. Froula, Editor, Laboratory for Laser Energetics, 250 East River Road, Rochester, NY 14623-1299, (585) 273-3686.

Worldwide-Web Home Page: <http://www.lle.rochester.edu/>
(Color online)