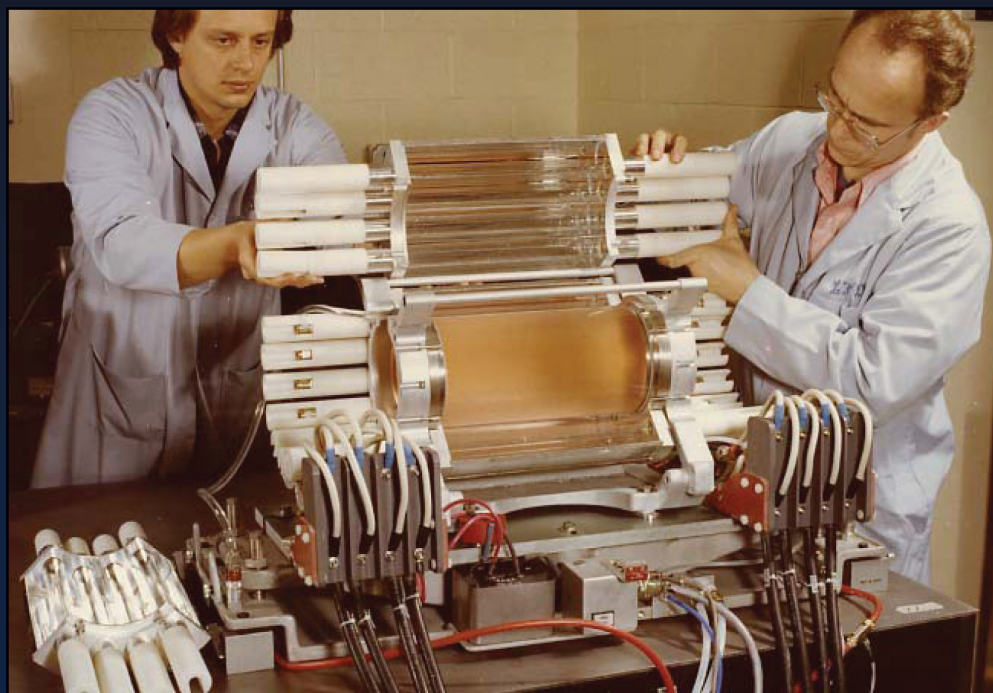


1977



Glass Development Laser



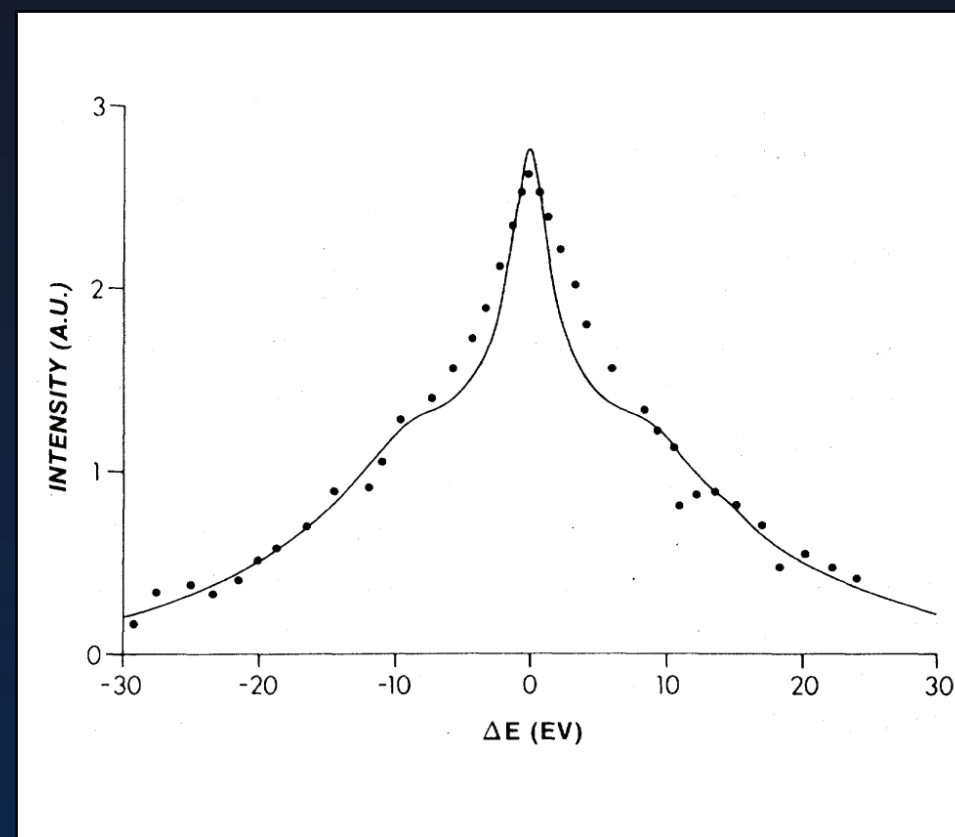
Steve Kumpan and Jo Bunkenburg working on rod-amplifier development

To verify the ability of the original 24-beam OMEGA laser to reach its specified performance level, a one-beam prototype system, GDL (glass development laser), was built in the “new” LLE building in 1977. By 8 November 1977, GDL (right) was producing peak power levels in excess of 0.5 TW per beam in short pulses. GDL continued to operate for a variety of experiments including the first demonstration of high-efficiency frequency tripling, the first comprehensive series of 0.35- μm laser-matter interaction experiments, and the first series of NLUF experiments.



Bill Lockman, GDL operator, adjusting the pinhole of one of the vacuum spatial filters.

Direct Compression Measurement of Imploded Targets

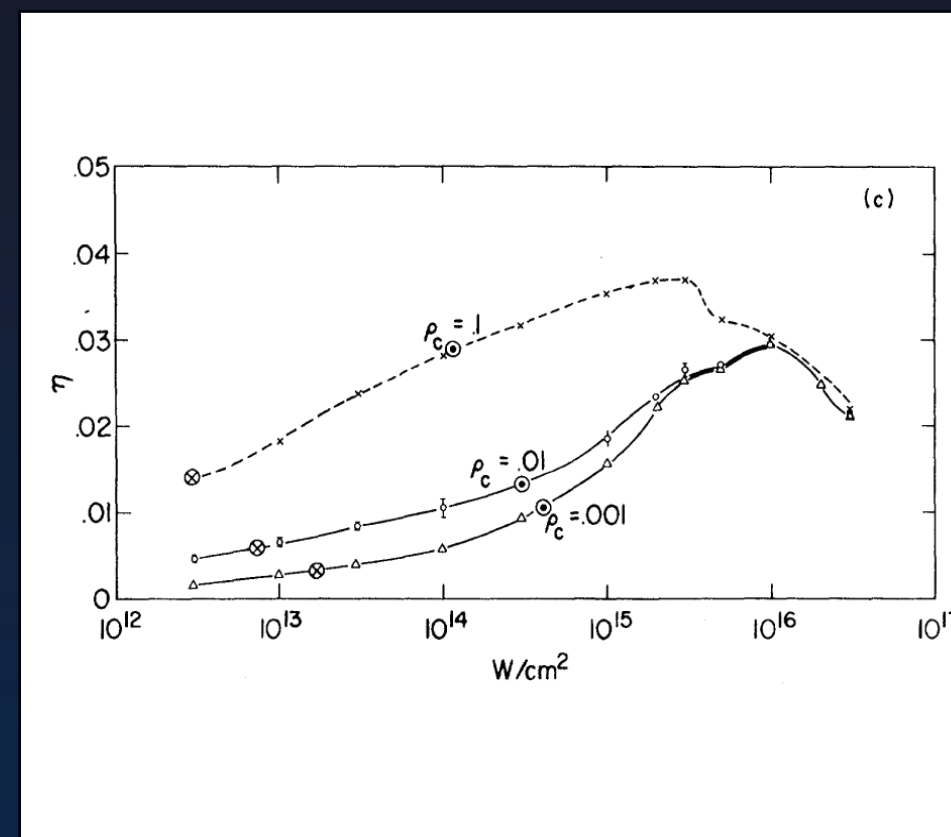


Compression measurement

The first direct measurement of compressed fuel density in a laser-imploded target using x-ray spectroscopy is reported in a *Physical Review Letters* article by LLE scientist B. Yaakobi *et al.*

B. Yaakobi, D. Steel, E. Thorsos, A. Hauer, and B. Perry, “Direct Measurement of Compression of Laser-Imploded Targets Using X-Ray Spectroscopy,” *Phys. Rev. Lett.* **39** (24), 1526–1529 (1977).

Laser-Driven Compression Efficiency and Wavelength



Scaling of hydrodynamic efficiency

On 7 March 1977, *Physical Review Letters* published a paper by R. L. McCrory of the Laboratory for Laser Energetics and R. L. Morse of the University of Arizona showing that the efficiency with which absorbed laser energy causes a given spherical implosion increases by a factor of 3 to 5 if the laser wavelength is decreased from the infrared wavelengths to the blue or near-ultraviolet. This finding was key in the thrust to develop high-efficiency frequency conversion for high-power Nd:glass fusion lasers.

R. L. McCrory and R. L. Morse, “Dependence of Laser-Driven Compression Efficiency on Wavelength,” *Phys. Rev. Lett.* **38** (10), 544–547 (1977).

1978



First Shot Fired on ZETA



Congressman Frank Horton

U.S. Congressman Frank Horton fired the first shot on ZETA, a laser comprising the first six beams of OMEGA, on 17 October 1978. The shot generated more than 300 million neutrons and climaxed the morning of what University President Robert L. Sproull called “a great day in the life of this University.” It was witnessed by approximately 200 guests from government, industry, and academia.

