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In Brief

This volume of the LLE Review, covering the period October–December 1996, includes a review of 2-D SSD as implemented on the OMEGA laser system. A summary of the detailed mathematical formalism is shown, and the predicted level of uniformity achievable on OMEGA is given. The first experimental results on uniformity using narrow-band 2-D SSD are compared to theoretical calculations. Excellent agreement between experiment and theory is found, which gives confidence that broadband 2-D SSD with polarization wedges should achieve an rms nonuniformity in the 1%–2% level necessary for cryogenic implosion experiments.

Other highlights of research presented in this issue are

- A method for measuring the areal density $\rho\Delta r$ of the compressed shell based on the observation of absorption lines from a titanium-doped layer. The method is tested using a simulated spectrum from a one-dimensional *LILAC* simulation. The predicted peak $\rho\Delta r$ of the compressed shell was within 17% of the value calculated directly from *LILAC*.

- A description of modeling the temporal-pulse-shape dynamics of the regenerative amplifier. The laser rate equations are presented along with a discussion of the regen dynamics. Excellent agreement is found between the model's predicted output and the experimentally observed output. It is now possible to model the entire OMEGA laser system, enabling on-target pulse shapes to be specified.

- A detailed analysis of the relativistic pondermotive force. A guiding center model is postulated, which is compared to numerical simulation of the actual particle motion. The formula is also verified analytically using the method of multiple scales. Work continues on this formalism to study the effects of the pondermotive force on laser-plasma interactions.

- A description of an electro-optic sampling system capable of imaging the voltage distribution over a rectangular region. The system is comparable to an ultrafast sampling oscilloscope with more than 180,000 channels.

- Methods to measure the fuel compression using nuclear diagnostics. The three ρR diagnostics being developed for OMEGA are reviewed. A discussion of future developments is presented.

Richard Town
Editor