Basic Science Research at LLE: This issue of the LLE monthly report highlights the basic science research conducted at LLE. Each year the Omega Facility Advisory and Scheduling Committee (FASC), following the guidance of DOE/NNSA, allocates ~25%–30% of Omega time to academic and laboratory basic science research. The National Laser Users' Facility (NLUF) program at LLE provides research opportunities to U.S. researchers from academic institutions and private industry and typically receives half of this allocation. The Laboratory Basic Science (LBS) program—available to scientists from the ICF laboratories—takes up the remainder of the allocation. Both programs require peer-reviewed proposal submissions. The solicitation for FY11 LBS proposals was completed in May. A total of 23 proposals were submitted, requesting two to three times the allocated shot time on OMEGA and OMEGA EP. Sixteen of these proposals were approved and will receive full or partial allocations in FY11. The solicitation for FY11–FY12 NLUF proposals by DOE/NNSA was issued on 3 June 2010 with proposals due 30 June 2010.

OMEGA Laser Users Group: The second Omega Laser Facility Users Group Workshop, held 28–30 April 2010, attracted 115 researchers from 19 universities, 21 centers and laboratories, and 5 countries. The purpose of the workshop is to facilitate communication and exchanges among the individual users and between the users and LLE. Sixty presentations highlighting on-going and proposed research experiments were given, most of which were presented by the 45 students and postdoctoral candidates in attendance. Plans for the next workshop, to be held 27–29 April 2011, are already underway.

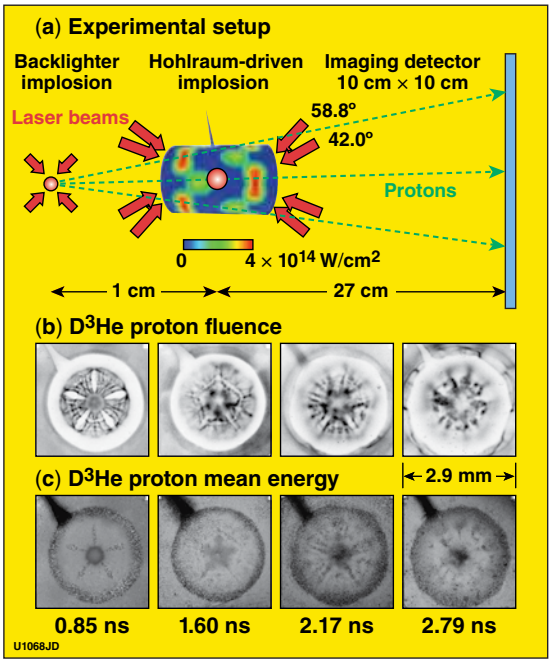

Figure 1. (a) Schematic of the experimental setup, with proton backlighter, hohlraum-driven implosion, CR-39 imaging detector, and laser drive beams. Fifteen laser beams entered each end of the hohlraum. The colors shown on the hohlraum wall indicate the laser-intensity distribution. The proton backlighter was driven by 30 laser beams with total laser energy of about 11 kJ in a 1-ns square pulse. The 15-MeV D^3He backlighting protons passed through the laser-driven hohlraum, sampling plasma conditions and capsule implosions at different times. Images in (b) show proton fluence (within each image, darker means higher fluence), while images in (c) show proton energy (within each image, darker means more proton energy loss and, therefore, more matter traversed). The gray-scale mapping for image display is different in each image. The capsule-mounting stalk appears in the upper left corner of each image.

Science *Article on Proton Radiography:* A recent issue of *Science* (5 March 2010, pp. 1231–1235) reported on an MIT-led NLUF experiment using monoenergetic 3- and 15-MeV protons to produce radiographs with stunning, kaleidoscope-like views, of hohlraum-driven implosions on OMEGA (Fig. 1). Plasma flows and three types of electric fields were observed, the strongest having the field strength of 1/10 of the Bohr field $\left(e/a_0^2\right)$. Time slices reveal the dynamics and evolution of fields and plasma flows. This work is important for understanding conditions in NIF hohlraums and implosions and includes collaborators from LLNL, GA, CEA, and the Fusion Science Center at LLE.

Omega Operations Summary: The Omega Laser Facility conducted 151 target shots in May with an average experimental effectiveness of 93.1% (115 on OMEGA with an experimental effectiveness of 93.5% and 36 on OMEGA EP with an effectiveness of 91.7%). Sixty-eight target shots were taken for the NIC program by teams from LLNL, LANL, and LLE. Forty-five shots were conducted for the LBS program by teams from LLE, LANL, and LLNL. Twenty-two shots were taken for NLUF programs led by a team from the University of California–Berkeley, and sixteen shots were conducted for the HED program by teams from LANL and LLE.

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