

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Initial Results from the OMEGA EP Laser System D.D. MEYERHOFER, R. BETTI, T.R. BOEHLY, J.H. KELLY, S.J. LOUCKS, R.L. MCCRORY, S.F.B. MORSE, P.M. NILSON, S.P. REGAN, T.C. SANGSTER, V.A. SMALYUK, C. STOECKL, W. THEOBALD, L.J. WAXER, Laboratory for Laser Energetics, U. of Rochester — The OMEGA EP Laser, with four NIF-like beams, was completed in April 2008. The beams can be operated at 351 nm, with each ultimately producing 6.5 kJ in a 10-ns pulse into the OMEGA EP target chamber. Two of the beams can be operated as high-energy petawatt lasers (HEPW), each producing up to 2.6 kJ in a 1053 nm, 10-ps pulse. The HEPW beams can be directed into the OMEGA EP target chamber or into the 60-beam OMEGA target chamber for experiments that combine target compression with HEPW capability. Initial experiments include measurements of the duration-dependent HEPW laser-to-fast-electron conversion efficiency, isochoric heating of small-mass targets, radiography of imploding targets, integrated fast ignition, materials physics, and the development of >10-keV backlighting sources. These results show the effectiveness of OMEGA EP for high-energy-density physics experiments. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

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Date submitted: 14 Jul 2009

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