FY16 Laboratory Basic Science Experiments Approved: The Laboratory Basic Science (LBS) program was established in FY08 to provide opportunities to the U.S. inertial confinement fusion (ICF) laboratories to perform fundamental high-energy-density scientific research using the Omega Laser Facility. In the period FY09–FY15, 196 LBS proposals were submitted to the program and upon peer review by independent committees, 101 of these proposals were approved and received shot time at the facility. The LBS program research carried out during this time included: exploration of the fundamental properties of matter under extreme temperature, density and pressure conditions; laboratory studies of phenomena essential to the understanding of astrophysical systems such as gamma ray bursts and supernova remnants; and exploration of advanced ignition configurations such as shock and fast ignition. References 1 to 3 represent some of the recent high impact publications from this program.

A call for proposals for the FY16 cycle of the LBS program was issued in February 2015 and resulted in 24 proposals requesting 48 shot days of Omega Facility time (20 shot days will be available in FY16). Upon review by the LBS Review Committee, 14 of these proposals were approved for shot time at the facility (ten shot days on the OMEGA laser and ten days on the OMEGA EP laser). The successful proposals are listed in Table I.

Table I: Approved FY16 Omega Facility Laboratory Basic Science Experiments

Principal Investigator	Title	Institution	Facility Required
R. Betti	Ultra-Strong Spherical Shocks for Nuclear and Materials Studies	LLE	OMEGA
J. H. Eggert	Development of Compressed Ultrafast Photography (CUP) Diagnostic for Dynamic Laser Compression Experiments	LLNL	OMEGA EP
C. J. Forrest	Studies of (n,2n) Reactions of Light Nuclei at E_n = 14 MeV Using High-Energy-Density Plasmas (HEDLP)	LLE	OMEGA
S. Ivancic	Integrated Channeling of High-Intensity Laser Beams in Implosions	LLE	Joint
A. E. Lazicki	Structural Studies of Electride Phases of High-Density Matter: Structures of Mg to Above 10 Mbar	LLNL	OMEGA
D. D. Meyerhofer	High-Field–Assisted X-Ray Source	LLE	Joint
J. D. Moody	Characterization of Laser-Driven Magnetic Fields Using Proton Deflectometry	LLNL	OMEGA EP
P. M. Nilson	Study of Particle Energization During Magnetic Reconnection in High-Energy-Density Plasmas	LLE	OMEGA EP
A. Pak	Ion Acceleration from Laser-Driven Electrostatic Shock Waves	LLNL	OMEGA EP
H.-S. Park	Weibel Instabilities and Astrophysical Collisionless Shocks from Laser-Produced Plasmas	LLNL	OMEGA
Y. Ping	Pressure Ionization in Ramp-Compressed Materials	LLNL	OMEGA
C. Stoeckl	Spectroscopy of Neutrons Generated Through Nuclear Reactions with Light Ions in Short-Pulse Laser Experiments	LLE	OMEGA EP
W. Theobald	Proton Transport and Coupling into Shock-Compressed CH Targets for Proton Fast Ignition	LLE	OMEGA EP
C. E. Wehrenberg	Kinetics, Mechanism, and Shear Strain of the bcc-to-hcp Transition in Shock-Compressed Iron from Laue Diffraction	LLNL	OMEGA

Omega Facility Operations Summary: The Omega Facility conducted 203 target shots in May with an average experimental effectiveness (EE) of 99.0% (116 on OMEGA with EE of 99.2% and 86 on OMEGA EP with EE of 98.8). ICF experiments by LANL, LLE, and LLNL accounted for 84 target shots while eight HED experiments carried out 75 target shots. Three NLUF experiments led by Rice University and Michigan University had 24 target shots and two LBS program projects accounted for 20 target shots.

1. M. Millot *et al*., Science **347**, 418 (2015); 2. C. M. Huntington *et al*., Nat. Phys. **11**, 173 (2015); 3. W. Theobald, *et al*., Nat. Commun. **5**, 5785 (2014).