

National Laser Users' Facility and External Users' Programs

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Under the facility governance plan implemented in FY08 to formalize the scheduling of the Omega Laser Facility as a National Nuclear Security Administration (NNSA) User Facility, Omega Facility shots are allocated by programs following NNSA guidance. The majority (~69%) of the Omega target shots are committed to the national Inertial Confinement Fusion (ICF) Program and the High-Energy-Density (HED) Program conducted by scientists from Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (LANL), Sandia National Laboratories (SNL), the Naval Research Laboratory (NRL), and LLE. In FY20, the Omega Laser Facility delivered a total of 1947 shots, among which about 72% of the total shots were conducted for the ICF and HED campaigns including calibration shots. The relative lower number of the total shots in FY20 is due to the disruption caused by the ongoing global Covid-19 pandemic. No experiments were conducted during 23 March to 15 May when the Omega Facility was on the Safe Standby mode. Nearly 25% of the approved FY20 experiments have been postponed to FY21. It is worth noting that the Omega shot operation resumed in June utilizing the new RemotePI operation protocol that enables all researchers at LLE and external users to safely and effectively conduct experiments remotely.

The Fundamental Science Program at the Omega Laser Facility, with projects selected through open-call and peer-reviewed processes, is typically allotted between 25% to 29% of the total Omega Facility shots. The NNSA-supported program has two distinct components: (1) the NLUF awards to individual principal investigator's (PI's) on a two-year cycle with the associated Omega Facility time (~18% of the overall facility time each year) for experiments led by U.S. academia and business; and (2) the Laboratory Basic Science (LBS) experiments approved annually (with ~11% of the Omega facility time) that are led by the NNSA ICF laboratories including LLNL, LANL, SNL, NRL, and LLE and the Office of Science laboratories such as SLAC, Princeton Plasma Physics Laboratory (PPPL), and Lawrence Berkeley National Laboratory (LBNL). From FY20, a few additional shot days on OMEGA EP have been made available to users of the newly established LaserNetUS network for basic HED science research supported by the DOE Office of Fusion Sciences (FES) within the DOE Office of Science. In FY20, these peer-reviewed user programs (NLUF, LBS, and LaserNetUS) obtained a total of 500 target shots that accounted for 27% of the overall Omega Facility shots.

The Omega Laser Facility has also been used for externally funded campaigns led by teams from the Commissariat à l'énergie atomique et aux énergies (CEA) of France, the joint Rutherford Appleton Laboratory (RAL), the University of York of the United Kingdom, and others. These externally funded experiments are conducted at the facility on the basis of special agreements put in place by UR/LLE and participating institutions with the endorsement of NNSA. During FY20, the RAL/York team performed 11 target shots on OMEGA and an LANL LDRD team conducted 9 shots.

The facility users who conducted experiments during this year included 16 collaborative teams participating in the NLUF Program with the Omega Laser Facility shot allocation from the FY20–FY21 awards; 17 teams led by scientists from LLNL, LANL, LLE, SLAC, PPPL, and LBNL participating in the LBS Program; 6 project teams from academia and national labs participating in the LaserNetUS Program; many collaborative teams from the national laboratories (LLNL and NRL) and LLE conducting ICF experiments; investigators from LLNL, LANL, SNL, and LLE conducting experiments for HED campaigns; and researchers from RAL/York.