Cross-Beam-Energy Transfer Diagnostic: Each OMEGA laser beam scatters unabsorbed 3ω light over the inner surface of the target chamber. A new temporally gated CBET beamlets diagnostic collects this light simultaneously from all 60 beams, and records an image using a charge-coupled–device camera. The light from each beam forms a distinct spot in the image when the image plane is placed at target chamber center. Each spot can be considered the end point of a beamlet of rays originating from a discrete point of the laser's beam spot, following a unique pathway refracting through the target's coronal plasma. The intensity of the beamlet spot depends on laser absorption as well as cross-beam energy transfer (CBET) with the other beams along that specific pathway. The diagnostic uses a time-resolved optical imager to limit the sampling time to as short as 200 ps. This enables the CBET beamlets diagnostic to study CBET isolated in time and along 60 unique propagation pathways in space. When multiple CBET beamlets diagnostics can be fielded in different OMEGA ten-inch manipulators, absorption and CBET can be mapped out for several beamlets over the profile of each beam.

Another feature of the diagnostic, a Wollaston prism, splits the collected light into two orthogonal polarization components, each recorded simultaneously. This enables the diagnostic to measure the polarization of the scattered light from the ratio of the spot intensity in the two images for each beam. In CBET, the exchange of energy is limited to the common polarization component of the beam pairs. This will alter the polarization of each beam. Figure 1 shows the first evidence of this polarization rotation caused by CBET in a direct-drive implosion. Detailed analysis of these images is underway.

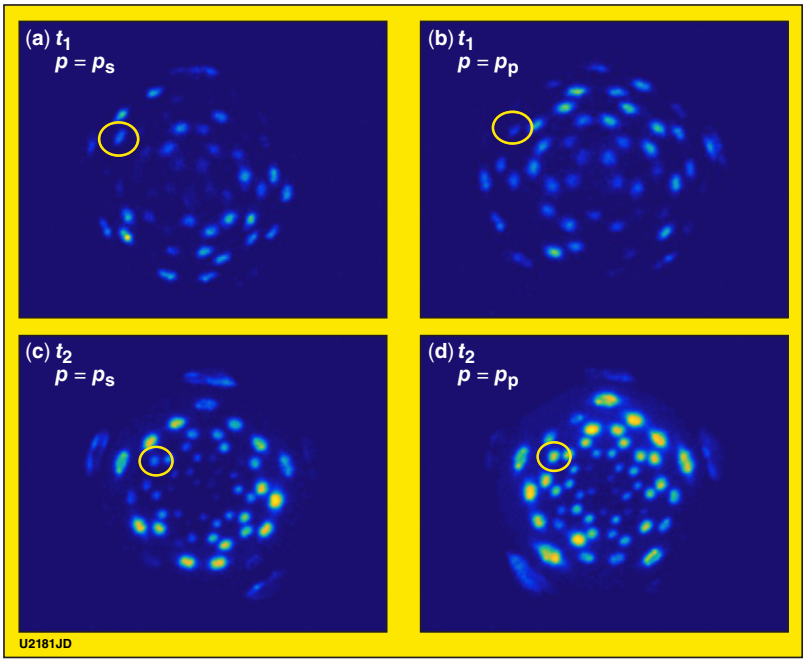

Figure 1. Images of scattered light from a 60-beam irradiation of a spherical target taken by the CBET diagnostic: [(a,b)] Images of the two orthogonal polarization components (P_s, P_p) recorded early in the laser pulse (t_1) when CBET effects are predicted to be small. [(c,d)] The same polarization components from a similar target shot recorded later in time (t_2) when CBET is predicted to be strong. The circles highlight the spot from the same beam in each image. In the early images, the "*s*" component of the beam (a) is more intense, while in the later images, the "*p*" component (d) is more intense. This observation indicates that the polarization of the light in the highlighted beamlet has rotated during the laser pulse.

Omega Facility Operations Summary: During April 2017, a total of 224 target shots were taken at the Omega Laser Facility with an average experimental effectiveness (EE) of 98.2% (164 shots on OMEGA with an EE of 99.4% and 60 shots on OMEGA EP with an EE of 95.0%). The ICF program accounted for 81 shots with experiments led by LLE, LLNL, and SNL, while the HED program had 106 shots for experiments led by LANL, LLNL, LLE, and SNL. Two NLUF experiments led by the University of Chicago and the University of Michigan, respectively, had 17 target shots and two LLNL LBS experiments accounted for 20 target shots.