Laser Direct Drive Inertial Confinement Fusion Research on OMEGA

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**Abstract:** The objective of the multi-year, systematic 100-Gbar Campaign on the 30-kJ, 351-nm, 60-beam OMEGA laser system is to demonstrate and understand the physics for hot-spot conditions and formation relevant for ignition at the MJ scale. Laser direct drive ignition requires a hot-spot pressure above 120 Gbar for an ion temperature of 4 keV and an implosion convergence ratio above 22. The physics goals and the laser and target requirements of the hydrodynamically-scaled DT cryogenic implosions on OMEGA are derived from laser direct drive ignition target designs for a 1.8 MJ laser system (e.g., the National Ignition Facility). The strategy to increase the hot-spot pressure from the current level of ~60 Gbar is to reduce the long and short wavelength perturbations, mitigate LPI’s, and increase laser-to-target energy coupling. In parallel, a predictive capability that maps the relationship between the 1-D simulations and the experimental results is being used to optimize target performance. This talk will summarize the 100-Gbar Campaign on OMEGA.

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