Abstract Submitted
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Novel Hot-Spot–Ignition Designs for Inertial Confinement Fusion with Liquid Deuterium–Tritium Spheres[1] VALERI GONCHAROV, IGOR IGUMENSHCHEV, DAVID HARDING, SAMUEL MORSE, SUXING HU, P.B. RADHA, DUSTIN FROULA, SEAN REGAN, T.C. SANGSTER, MICHAEL CAMPBELL, Laboratory for Laser Energetics — A new class of ignition designs is proposed for inertial confinement fusion (ICF) experiments. These designs are based on the hot-spot–ignition approach, but instead of conventional targets that comprise of spherical shells with thin frozen deuterium–tritium (DT) layers, liquid DT spheres are used where the lower-density central region and higher-density shell are created dynamically by appropriately shaping the laser pulse. These offer several advantages, including simplicity in target production and lower sensitivity to physics uncertainty in shock interaction with the ice/vapor interface. The design evolution starts by launching an ˜1-Mbar shock into a homogeneous DT sphere. After bouncing from the center, the reflected shock reaches the outer surface of the sphere and the shocked material starts to expand outward until its pressure drops below the ablation pressure. At this point, an adjustment shock is launched inward by supporting ablation pressure. This shock compresses the ablator and fuel, forming a shell. The shell then is accelerated and compressed by appropriately shaping the drive laser pulse, similar to the conventional thin-shell, hot-spot designs. This talk will discuss the feasibility of the new concept using hydrodynamic simulations.

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