Abstract Submitted
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Sensitivity of the Convergence to Direct-Drive Cylindrical Implosion Parameters[1] WILLIAM GAMMEL, JOSHUA SAUPPE, JOHN KLINE, SASIKUMAR PALANIYAPPAN, KIRK FLIPPO, BENJAMIN TOBIAS, NOMITA VAZIRANI, Los Alamos National Laboratory — To achieve efficient thermonuclear burn in Inertial Confinement Fusion (ICF) implosions, high convergence is needed to reduce the required amount of driver energy. Additionally, there is a well-known correlation between the convergence and hydrodynamic instabilities, such as the Rayleigh-Taylor (RT) instability, which have a deleterious effect on ICF. Thus, examining both the consequences of high convergence as well as the target parameters necessary for achieving this condition is essential to the development of robust target designs. 1D simulations of cylindrical targets produced by the Los Alamos Eulerian radiation-hydrodynamics code, `xRAGE`, have been used to search our target parameter space. Studying the topology of these spaces both informs our understanding of the sensitivity of the convergence to target design parameters, such as fill density, and provides insight into the exact extent to which instability growth can be attributed to convergence. We will present future plans for high convergence direct-drive cylindrical implosion experiments fielded at the National Ignition Facility (NIF). Experiments utilizing the NIF should be able to produce high quality measurements reaching convergences near 15; 4x greater than previous cylindrical implosions.

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