Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Preliminary Double Cylinder Target Design for Study of Hydrodynamic Instabilities in Multi-shell ICF[1] REBECCA ROYCROFT, JOSHUA SAUPPE, PAUL BRADLEY, Los Alamos National Laboratory — The use of cylindrical implosions to study hydrodynamic instability growth for ICF applications [S. Palaniyappan, et al. Phys. Plasmas **27**, 042708 (2020)] is attractive, as cylindrical implosions allow for easier diagnostic access (on axis) while retaining convergence effects. In this work, we aim to use the established cylindrical implosion platform to inform the double shell ICF campaign [D. Montgomery, et al. Phys. Plasmas **25**, 092706 (2018)] and other multi-shell ICF concepts. We are designing a double cylindrical target as an analogue to the double shell ICF capsule in order to study hydrodynamic instability growth on the high-Z inner shell. We present preliminary design simulations from xRAGE [M. Gittings, et al. Comput. Science and Discovery **1**, 015005 (2008)], where we have scanned cylindrical target dimensions in 1D to optimize the surrogacy to spherical double shell implosions. In particular, we attempt to match the Atwood number and acceleration profile of the inner cylinder, as well as the kinetic energy transfer from the outer to the inner cylinder. We evaluate the feasibility of fielding this target at OMEGA, where we plan to measure the instability growth on the inner shell using radiography of the implosion.

[1]Work performed by Los Alamos National Laboratory, operated by Triad National Security, LLC under Contract 89233218CNA000001 for the National Nuclear Security Administration of the U.S. Department of Energy.

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Date submitted: 23 Jun 2020 Electronic form version 1.4