Direct Drive Reentrant Cone Targets for Fast Ignition

General Atomics, P.O. Box 85608, San Diego, California 92186-5608

S.P. Hatchett
Lawrence Livermore National Laboratory, Livermore, California 94550, USA

C. Stoeckl, M.J. Bonino, T.C. Sangster
Laboratory for Laser Energetics, University of Rochester, Rochester, New York, USA

H. Shiraga, S. Fujioka and K.A. Tanaka
Institute for Laser Engineering, Osaka University, Osaka, JAPAN

Targets designed for fast ignition (FI) must have clear access for the ignitor laser to the compressed pellet core. This is provided in current concepts by embedding a reentrant cone into a spherical shell, with the tip of the cone close to the center of the shell. We have designed a gas-tight direct-drive target as the first step in developing a FI target, and have studied its implosion dynamics at the Omega laser at UR/LLE, using back-lit and self-emission framing cameras. A step in the cone surface, and an aluminum coating on the shell were required to make the assembly gas-tight; this shell type withstood >10 atm gas fill pressure and had a typical pressure half-life of 2-6 hrs. The implosion of these targets were substantially different from those of previous indirect drive targets [1]: there was much less vaporization of the cone; much clearer structure in the collapsing shells; and, a possibility that the hot core could escape around the cone rather than punch in its tip. Additionally self-emission images showed the heating of the shell core gas and the effect of the gas on the cone tip. These results will be compared to simulations.


Oral presentation preferred

Contact:
R.B. Stephens
General Atomics
P.O. Box 85608
San Diego, CA 92014
USA
ph: (858) 455-3863
fax: (858)455-2399
e-mail: rich.stephens@gat.com