

# DEVELOPMENT OF IFE TARGET SYSTEMS ON THE NIF

K. R. Schultz  
General Atomics, San Diego, California 92186-9784

The Target Systems session of the Workshop on NIF Experiments for IFE [1] developed a list of critical issues for IFE target systems, categorized into target fabrication issues and target transport issues:

## Target Fabrication Issues

- Low-cost mass-production techniques for capsules and their effect on gain
- Low cost mass production techniques for hohlraums
- The effect of cryogenic layer quality on gain
- Automated cryogenic assembly techniques
- Fast fill techniques for low tritium inventory
- High-throughput quality inspection

## Target Transport Issues

- Injection techniques for high rep-rate cryogenic operation
- Time and space accuracy and sensing
- Integration
- Target survival under acceleration
- Thermal protection and temperature control
- Chamber environment effects on trajectory
- Demonstration of high rep rate operation

The NIF can play an important role in resolution of these issues and development of target systems for IFE.

Most target fabrication issues must be resolved by development work in the laboratory, not in the NIF, and many must be resolved before the NIF can be successful. However, investigation of the effect on target yield of various design changes from ignition experiment targets to targets that can be economically mass-produced must be done in actual implosion experiments, and the NIF can make valuable contributions to this development. While these NIF experiments can be done with minimal impact on the design of the NIF, several hundred high yield shots could be needed.

Target transport issues related to target handling, insertion and tracking must also be addressed by development work in the laboratory. However, integration of these components into a complete system, and demonstration of this system could be done most convincingly on the NIF. The effect of inertial fusion reaction chamber conditions on the survival and performance of targets must be determined under actual reaction chamber conditions, and experiments in the NIF could help in this effort. The target transport issues experiments will require insertion system hardware and an inner chamber to simulate IFE post-shot conditions be added to the NIF, but will have little impact on the basic NIF design. The total number of shots needed should be less than 100.

Experiments done in the NIF could play a valuable role in developing target systems for IFE. These experiments should have minor impact on the basic design of the NIF, but could require several hundred dedicated, high yield shots.

[1] B.G. Logan, M.T. Tobin and W.R. Meier, eds., "The Role of the National Ignition Facility in the Development of Inertial Fusion Energy," Lawrence Livermore National Laboratory Report UCRL-ID-119383, April 1995.

# ABSTRACT SUBMISSION FORM 16th IEEE/NPSS Symposium on Fusion Engineering

September 30 — October 5, 1995  
Champaign, Illinois, USA

Paper Title: **Development of IFE Target Systems on the NIF**

Technical Topic Number:

Keywords:

- (1) ICF
- (2) NIF
- (3) Target systems

- If an oral presentation is requested (rather than the standard poster presentation) indicate here
- Enter my paper in the "Distinguished Paper" competition. (Requires August 30 submission of full paper)

Submitted by:

Signature

Typed Name K. R. Schultz

Institution/Company General Atomics

Address P.O. Box 85608

City, Province, State/Postal Code  
San Diego, California 92186-9784

Country USA

Phone: (619) 455-4304

Fax: 619 455-2399

E-mail: schultz@gav.gat.com

