

**DEVELOPMENT OF SOLID COLLECTION
DIAGNOSTICS ON NIF THROUGH BLAST SHIELD
ANALYSIS**

Dawn A. Shaughnessy, Sarah L. Nelson, Kenton J. Moody,
Pat M. Grant, Ian D. Hutcheon and Laurence A. Lewis
*Lawrence Livermore National Laboratory, 7000 East Ave.
Livermore, CA 94551 USA*

The National Ignition Facility (NIF) at Lawrence Livermore National Laboratory will be performing credible ignition attempts as early as 2010. One of the fusion diagnostic methods under development is collection of post-shot solid debris. Materials doped into the NIF capsule ablator shell will activate as a result of interaction with DT fusion neutrons. Collection and analysis of this material following a shot will allow for determination of capsule performance, as well as serve as a means for performing nuclear science-based measurements on NIF. In order to collect debris, the distribution and chemical form of the debris material must be known. We are currently conducting research into the performance of a variety of materials for possible use as NIF collectors, and these results will be discussed in a separate presentation. In order to evaluate debris distribution, we are analyzing the disposable debris shields and aluminum blast shields that were present as part of some of the nuclear diagnostic housings. Initial results indicate that the debris characteristics differ greatly between the equator and pole of the chamber. In addition, the degree of change of the chemical morphology of the blast shields provides an indication as to the optimal distance for fielding a collector in the NIF chamber. In this presentation, we will show images of the post-shot blast shields as well as quantitative analyses of the debris droplets. Future experiments will be discussed in conjunction with the upcoming NIF campaigns.

*This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344. This work was funded by the Laboratory Directed Research and Development Program at LLNL under project tracking code 09-ERD-085.