

Measuring Opacity Variations In NIF Shells*

S.A. Eddinger, R.B. Stephens, H. Huang, G. Flint, A. Nikroo, T.J. Drake,
and C.R. Bystedt

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

NIF specifies to measure the optical depth ($\mu \cdot x$) to 1 part in 10^4 with $120 \mu\text{m}$ resolution. We have designed a system that meets this specification with a 1 day measuring time with 97.5% shell coverage. This design optimizes our system in both speed and sensitivity of measurements. The $\mu \cdot x$ fluctuations were compared to the surface profiles of the AFM spheremapper for a variety of shells. We have found surface height fluctuations (x), not opacity fluctuations (μ), dominate undoped shells for all modes that we can measure. Our system has been designed so that we can easily increase the resolution to $60 \mu\text{m}$ enabling higher mode numbers. This will require longer run times, but due to relaxed NIF specifications at higher resolution, only by a factor of two.

*Work supported by U.S. Department of Energy under Contract DE-AC03-01SF22260.