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Theory Experiment

A New Approach to Quantitative NIF GXD Image Analysis,
H Huang, K Sequoia, *General Atomics*, – A Gated X-ray Detector (GXD) is used by the National Ignition Facility (NIF) as a shot diagnostic instrument to record the ablator implosion process. Quantitative information must be retrieved from a series of time lapsed images to guide the NIF target design and laser tuning. Varying shapes and the presence of localized or contiguous hot spots make it very difficult to quantitatively compare shots from different experiments. Based on the observation that any deviation from a perfect spherical shape is undesirable, we have developed a symmetry based algorithm to decompose a GXD image into two parts: a main blob image that retains symmetry around the hohlraum axis and a residual image that describes the hot spots. This approach allows the retrieval of laser tuning information from the main blob symmetry without assuming user-defined thresholds, the computation of x-ray emission profiles through Abel inversion, and the study of ablator premix from the hot spots.

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