New Results from the NIF Gated LEH imager

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Since its implementation, the ns-Gated Laser Entrance Hole (G-LEH) diagnostic [1] has successfully acquired data on over 600 experiments at the National Ignition Facility (NIF). The large quantity of images from a variety of physics campaigns provides new information on plasma evolution in hohlraums, include the dynamic evolution of the laser entrance hole, the growth of the laser-heated gold plasma bubble, the change in brightness of inner beam spots (due to time-varying cross beam energy transfer, absorption along the inner beam path, or backscatter), and plasma instability growth near the hohlraum wall.

The G-LEH diagnostic which takes time-resolved gated images along a single line-of-sight, incorporates a high-speed multi-frame CMOS x-ray imager developed by Sandia National Laboratories into the existing Static X-ray Imager diagnostic at NIF. It is capable of capturing two laser-entrance-hole images per shot on its 1024x448 pixel photo-detector array, with integration times as short as 2 ns per frame.

In this presentation, we will summarize the experimental data from G-LEH for Inertial Confinement Fusion (ICF) shots, and highlight the agreements and discrepancies compared to simulations.

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References

[1] H. Chen, N. Palmer, M. Dayton, et al., Rev. Sci. Instr. **87**, 11E203 (2016)