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12.7 Advancing the capability of NIF Gated LEH imager

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The ns-Gated Laser Entrance Hole (G-LEH) diagnostic take time-resolved gated images along a single line-of-sight by incorporating 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 was expected to capture two laser-entrance-hole images per shot on its 1024x448 pixel photo-detector array, with integration times as short as 2 ns per frame. Recent off-line calibrations of the diagnostic revealed the detailed characteristics including the temporal response and gain uniformity. Based on this measurement, new configurations have been developed to take advantages of the detector response, providing 4-8 interleaved frames per experiment. These designs have greatly enhanced the diagnostic capabilities in terms of data return. This presentation will summarize the diagnostic improvements as well as the data obtained from a variety of physics campaigns on plasma evolution in hohlraums including 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. This work was performed under the auspices of the U.S. Department of Energy by LLNS, LLC, under Contract No. DE-AC52- 07NA27344.

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