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2.37 The NIF backscatter system: current capabilities and planned improvements

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Recent indirect drive hohlraum designs for ignition targets on the National Ignition Facility (NIF) are exploring higher laser energy (~ 2 MJ) and power (500 TW) as a way of increasing neutron yield. A consequence is increased laser-plasma interactions (LPI), resulting in increased hot-electrons and cross-beam transfer that moves laser power between laser cones and backscatter in the form of stimulated Brillouin and stimulated Raman scattering (SBS and SRS). Accurate measurement of the backscattered light can give insight into the hohlraum plasma conditions and help quantify the amount of energy that is coupled into the hohlraum. Backscattered light is currently measured at NIF using a full aperture backscatter system (FABS) and near backscatter imager (NBI) instrument. Both diagnostics work in synergy to measure the backscattered energy, power, and temporal spectra evolution. In this work, we will present the current status of these diagnostics and discuss future improvements that will lead to more accurate results. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under the contract DE-AC52-07NA27344. Lawrence Livermore National Security, LLC. LLNL-ABS-744433.

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