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2.33 Performance of a Cauchois Geometry Spectrometer at the National Ignition Facility

Monday, 16 April 2018 10:46 (120)

The NIF Survey Spectrometer (NSS) which uses the Cauchois geometry has been installed on the Nation Ignition Facility. The NSS is used to measure and L-shell emission from Au Holhraums and K-shell emission from mid to high Z elements from backlighters and bright x-ray sources. The NSS is mounted on a port at the bottom of the chamber with a line of sight that is 37° from vertical. This location allows an unobstructed view of the various x-ray sources and into the laser entrance hole of Hohlraums. The spectrometer has four separate crystal channels that can be reconfigured as required. Currently, quartz transmission crystals with 2d = 8.512, 6.684, 2.750 and 1.624 Å are available. Emission from 6.5 to a few 100 keV can be measured with significant spectral overlap between each crystal channel. The dispersion has been calculated for the NIF geometry and agrees with the location of several filter K-edges routinely fielded in the filter packs. The resolution of the instrument is $\tilde{}$ 140 in first order at E(photon) = 13 keV. Instrument details, first light results and initial performance will be presented. This work was done under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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