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Improved hard x-ray (50-80 keV) imaging of hohlraum implosion experiments at the National Ignition Facility

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Abstract. We recently designed, built and commissioned a new pinhole/filter assembly for the equatorial hard x-ray imager (eHXI) at the National Ignition Facility (NIF). eHXI is a permanently installed, time-integrating pinhole imager in the equatorial plane, recording two-dimensional images of hohlraum targets at photon energies between 50 and 80 keV in inertial confinement fusion (ICF) implosion experiments. These images are complimentary to the FFLEX diagnostic [1], which measures spatially integrated hard x-ray spectra. The new eHXI assembly has improved the photon collection efficiency along with spectral and spatial resolution. In addition we added a Ross pair filter set for Au K-alpha emission (67-69 keV). The new eHXI design will improve our understanding of the sourcing of hot electrons, generated in laser-plasma-instabilities, along the vertical hohlraum axis. This information is an important input for simulating and eventually limiting the DT fuel pre-heat in ICF implosions [2].

References

- [1] M. Hohenberger *et al.*, Rev. Sci. Instrum. **85**, 11D501 (2014)
- [2] T. Doeppner *et al.*, Phys. Rev. Lett. **108**, 135006 (2012)

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