Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Crystal and source characterization for the Crystal Backlighter Imager capability at the National Ignition Facility[1] C. M. KRAULAND, General Atomics, G. N. HALL, J. G. BUSCHO, R. HIBBARD, T. J. MCCARVILLE, R. LOWE-WEBB, S. L. AYERS, D. KALANTAR, T. KOHUT, G. E. KEMP, D. K. BRADLEY, P. BELL, O. L. LANDEN, T. N. BREWSTER, K. PISTON, Lawrence Livermore National Laboratory — The Crystal Backlighter Imager (CBI) is a very narrow bandwidth (˜10 eV) x-ray radiography system that uses Bragg reflection from a spherically-curved crystal at near normal incidence. This diagnostic has the capability to image late in an ICF implosion because it only requires the brightness of the backlighter to be larger than the capsule self-emission in that narrow bandwidth. While the limited bandwidth is advantageous for this reason, it also requires that the effective energy of the backlighter atomic line is known to ˜1 eV accuracy for proper crystal alignment. Any Doppler shift in the line energy must be understood for the imaging system to work. The work presented details characterization experiments done at the Jupiter Laser Facility with a Si (8 6 2) crystal that will be used with a Selenium backlighter in the NIF CBI diagnostic. We used the spherically-bent crystals to image a small (˜200 m) Heα source generated by the Janus laser on a Se foil. Scanning Bragg angles over multiple shots allowed us to map out the spectral line intensity distribution for optimal alignment in NIF. A subsequent Doppler shift measurement using CBI on NIF will also be presented with complementary HYDRA modeling for both experiments.

[1]Prepared by LLNL under Contract DE-AC52-07NA27344 and by General Atomics under Contract DE-NA0001808

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Date submitted: 14 Jul 2017 Electronic form version 1.4