

Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

X-ray (17 – 99-keV) diagnostics for the 200-TW Trident Laser¹

JAMES COBBLE, JONATHAN WORKMAN, Los Alamos National Laboratory, NALIN VUTISALCHAVAKUL, Ohio Wesleyan University — The sub-ps Trident laser can deliver >100 J on target. The target irradiance is $\sim 10^{20}$ W/cm². X-ray diagnostics include a Laue x-ray spectrograph, a Ross filter pair to measure conversion efficiency of laser light to K-shell emission, and a single-photon-counting x-ray CCD camera. For the Laue instrument, we discuss design features used to limit corruption of the recorded spectra by \sim MeV electrons and bremsstrahlung: a tungsten shield in the front, low-Z, thick-wall construction materials, magnetic traps, light traps, and a special sandwich-style film holder. For the Laue geometry where a LiF 200 crystal has a bandpass of 17 - 70 keV, LiF 220 shifts the bandpass to 24 - 99 keV. The sensitivity of Si p-i-n diodes is adequate to record x-ray emission up to \sim 100 keV. With a carefully matched Ross filter pair, we may estimate the signal between the filter edges of two channels through subtraction of signals. The K-shell emission is expected to exceed the continuum contribution to the signal. These instruments will be employed to optimize the efficiency of x-ray backlighters in this energy range. The x-ray CCD is discussed in a parallel poster.

¹This work is done under the auspices of the United States Department of Energy, Contract number DE-AC52-06NA25396.

James Cobble
Los Alamos National Laboratory

Date submitted: 17 Jul 2008

Electronic form version 1.4