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# 2.48 High-Resolving-Power, Streaked X-Ray Spectroscopy on the OMEGA EP Laser System 

Monday, 16 April 2018 10:46 (120)


#### Abstract

A high-resolving-power, streaked x-ray spectrometer is being developed and tested on the OMEGA EP Laser System to study temperature-equilibration dynamics in rapidly heated metal. The instrument is based on two diagnostic channels, each with a spherical Bragg crystal. Channel 1 couples a spherical Si220 crystal to an x-ray streak camera. Channel 2 couples a second, identical crystal to an x-ray charge-coupled device (CCD), allowing for photometric calibration of the time-resolved spectrum. The instrument covers the spectral range of 7.97 to 8.11 keV , centered on the $\mathrm{Cu} \mathrm{Ka1} \mathrm{line} \mathrm{at} 8.05 \mathrm{keV}$. The time-resolved spectrometer is designed to achieve a resolving power of 2000 and a temporal resolution of 2 ps . The instrument capabilities are demonstrated by resolving the $\mathrm{Cu} \mathrm{Ka} 1,2$ doublet on high-power shots. Time-resolved $\mathrm{Cu} \mathrm{K} \alpha$ spectra for a wide range of high-power laser and target interactions, where heating and K $\alpha$ emission is generated by hot-electron-energy deposition, will be presented. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.


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