

HTPD 2018



Contribution ID : 191

Type : not specified

## 4.13 Developing a long duration Zn K-alpha source for x-ray scattering experiments

Monday, 16 April 2018 20:31 (120)

We are developing a long-duration K-alpha x-ray source at the OMEGA laser facility. Such sources are important for x-ray scattering measurements at small scattering angles, where high spectral resolution is required. To date, He-alpha x-ray sources are the most common probes in scattering experiments, using ns-class lasers to heat foils to keV temperatures resulting in K-shell emission from He-like charge states. The high temperature of the emitting plasma introduces significant thermal broadening, reducing the resolution of scattering measurements. Here, we combine the long duration of He-alpha sources with the narrow spectral bandwidth of cold K-alpha emission. Using a foil-stack target, we produced a Zn K-alpha source using a 1 ns laser pulse from the OMEGA laser. A Ge foil was irradiated by the OMEGA laser, producing Ge He-alpha emission, which pumped Zn K-alpha emission from a nearby Zn layer. Using this technique, we present a long duration K-alpha source suitable for scattering measurements. This work was supported by the US DOE under grant No. DE-NA0001859, under the auspices of the US DOE by Lawrence Livermore National Laboratory under Contract No. DE-AC52-07NA27344, and supported by Laboratory Directed Research and Development (LDRD) Grant No. 18-ERD-033.

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Session Classification : Session #4, Monday Night Poster Session