

Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Wire array K-shell sources on the SPHINX generator THIERRY D'ALMEIDA, FRANCIS LASSALLE, JULIEN GRUNENWALD, PATRICK MAURY, FRÉDÉRIC ZUCCHINI, CEA, NICOLAS NIASSE, JEREMY CHITTENDEN, Imperial College — The SPHINX machine is a LTD based Z-pinch driver operated by the CEA Gramat (France) and primarily used for studying K-shell radiation effects. We present the results of experiments carried out with single and nested large diameter aluminium wire array loads driven by a current of ~ 5 MA in ~ 800 ns. The dynamic of the implosion is studied with filtered X-UV time-integrated pin-hole cameras. The plasma electron temperature and the characteristics of the sources are estimated with time and spatially dependent spectrographs and PCDs. It is shown that Al K-shell yields (>1 keV) up to 27 kJ are obtained for a total radiation of ~ 230 kJ. These results are compared with simulations performed using the latest implementation of the non-LTE DCA code Spk in the 3D Eulerian MHD framework Gorgon developed at Imperial College. Filtered synthetic bolometers and PCD signals, time-dependent spatially integrated spectra and X-UV images are produced and show a good agreement with the experimental data. The capabilities of a prospective SPHINX II machine (20 MA ~ 800 ns) are also assessed for a wider variety of sources (Ti, Cu and W).

Thierry d'Almeida
CEA

Date submitted: 27 Jun 2014

Electronic form version 1.4