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X-ray Thomson scattering of shocked carbon foam on the Z accelerator[1] TOMMY AO, ERIC HARDING, JAMES BAILEY, RAYMOND LEMKE, MICHAEL DESJARLAIS, STEPHANIE HANSEN, IAN SMITH, JOSEPH RENEKER, DUSTIN ROMERO, DANIEL SINARS, GREGORY ROCHAU, JOHN BENAGE, Sandia National Laboratories — Experiments on the Sandia Z pulsed-power accelerator have demonstrated the ability to produce warm dense matter (WDM) states with unprecedented uniformity, duration, and size, which are ideal for investigations of fundamental WDM properties. For the first time, a space-resolved x-ray Thomson scattering (XRTS) spectra from shocked carbon foam was recorded on Z. The large electrical current produced by Z was used to launch Al flyer plates up to 25 km/s. The impact of the flyer plate on a CH_2 foam target produced a shocked state with an estimated pressure of 0.75 Mbar, density of 0.52 g/cc, and temperature of 4.3 eV. Both unshocked and shocked portions of the foam target were probed with 6.2 keV x-rays produced by focusing the Z-Beamlet laser onto a nearby Mn foil. The data is comprised of three spatially distinct spectra that were simultaneously captured with a single spectrometer. These three spectra provide detailed information on the following target locations: the laser spot, the unshocked foam, and the shocked foam.

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