

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Study of exploding Al wire plasmas using X-ray absorption spectroscopy¹ SERGEY A. PIKUZ, TATIANA A. SHELKOVENKO, CAD L. HOYT, ADAM D. CAHILL, DAVID A. HAMMER, Cornell University — X-ray absorption spectroscopy is a powerful diagnostic technique useful for determining the charge state, temperature and density of plasmas under a wide range of conditions and situations. Our particular interest was the study of the core-corona system generated in electrically exploded wires and wire array Z-pinches. Two wide-bandwidth spectrographs with flat and concave cylindrically bent KAP crystals, and high-resolution spectrographs with spherically bent quartz crystals have been used on the XP and COBRA pulsers at Cornell University. The hybrid X-pinch was used as the continuum x-ray source in the photon energy range of interest for absorption spectroscopy with exploding Al wire experiments. This source is capable of producing broadband continuum x-ray pulses with micron source size and 100 ps duration. Absorption spectra of single exploded Al wires and 2 - 4 wire arrays were recorded with high spatial resolution. The parameters of the dense wire core plasmas and the ablating plasma streams were estimated under different experimental conditions. New spectral features in absorption spectra were observed.

¹Work supported by the SSAA program of the NNSA under DOE Cooperative Agreement DE-FS03-02NA00057.

Sergey A. Pikuz
Cornell University

Date submitted: 09 Jul 2012

Electronic form version 1.4