

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Radiative Properties of Argon Gas-Puff Implosions on COBRA¹

NICHOLAS OUART, Plasma Physics Division, Naval Research Laboratory, NIANSHENG QI, PHIL DE GROUCHY, TATIANA SHELKOVENKO, SERGEI PIKUZ, Laboratory of Plasma Studies, Cornell University, JOHN GIULIANI, ARATI DASGUPTA, Plasma Physics Division, Naval Research Laboratory, JOHN APRUZESE, Consultant to NRL through Engility Corporation, ROBERT CLARK, Berkeley Research Associates, DAVID HAMMER, BRUCE KUSSE, Laboratory of Plasma Studies, Cornell University — Gas-puff Z-pinch experiments were performed on the 1 MA COBRA pulsed power generator at Cornell University. The gas puffs were injected into the load region from a triple nozzle. The load region had an anode-cathode gap of 2.5 cm. The standard diagnostics on COBRA include time-integrated pinhole cameras, a time-integrated axially resolved x-ray spectrometer, filtered photo-conducting detectors, and time-gated XUV cameras. We will focus mainly on results from pinhole images and x-ray spectra from argon gas puffs including some with a SO₂ dopant. The x-ray time-integrated pinhole images feature a tight axially uniform plasma column with a diameter of approximately 1 mm for argon gas implosion. The x-ray spectrometer used mica crystals ($2d=19.84 \text{ \AA}$) and captured the argon K-shell radiation from different crystal reflections. A 1-D multi-zone argon and sulfur non-LTE kinetics code with radiation transport is used to model the K-shell emission for the purpose of inferring the plasma conditions and the interaction of gas from the inner annulus with the central jet.

¹This work is supported by DOE/NNSA

Nicholas Quart
Naval Research Laboratory

Date submitted: 23 Jul 2015

Electronic form version 1.4