Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Plasma Density Measurements within Tungsten Wire-Array Z-Pinches on the COBRA Accelerator[1] JON DOUGLASS, RYAN MCBRIDE, KATE BELL, PATRICK KNAPP, JOHN GREENLY, SERGEI PIKUZ, TANYA SHELKOVENKO, DAVID HAMMER, Cornell University — The COBRA pulsed-power generator, with a nominal peak current of 1.1 MA and a minimum zero-to-peak rise-time of about 100ns, is being used to study the early phases of wire-array z-pinch development with a variety of diagnostics. Here we present the results of applying point-projection x-ray radiography to make accurate, high-resolution spatial and temporal measurements of the plasma density distributions in tungsten (W) wire-array z-pinch implosions. Density measurements are quantified by comparing x-ray transmission recorded on photographic films to transmission through W calibration steps of known thicknesses. Plasma density distributions as a function of time are presented for the coronal (10^{18}-10^{20}/cm^3), ablation ($<10^{18}$/cm^3) and on-axis ($<10^{19}$/cm^3) plasmas during the pre-stagnation phases of z-pinch dynamics (70-170 ns after the start of the current pulse). With this data set the time dependence of ablation velocity and corresponding mass ablation rate are addressed.

[1]This research was supported by the Stewardship Sciences Academic Alliances program of the National Nuclear Security Administration under DOE Cooperative agreement DE-FC03-02NA00057.

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Date submitted: 18 Jul 2007 Electronic form version 1.4