Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Plasma signatures on radially resolved line emission S.B. HANSEN, B. JONES, G.A. ROCHAU, J.E. BAILEY, D.J. AMPLEFORD, C.A. JENNINGS, C.A. COVERDALE, M.E. CUNEO, Sandia National Labs, Y. MARON, V. FISHER, V. BERNSHTAM, A. STAROBINETS, L. WEINGARTEN, Weizmann Institute — In the last few years, various intriguing emission profiles have been observed in time-gated, radially resolved measurements of K-shell line emission from imploding and stagnating Z-pinch plasmas. The radially resolved lines have appeared as hollow or closed ovals whose extents in the spatial and (Doppler-shifted) wavelength dimensions record the plasma radius and velocity, respectively. Optically thick lines can lead to asymmetries in both spatial and wavelength dimensions, such as limb darkening and preferential absorption of velocity-matched wavelengths. We present the results of a comprehensive investigation of density, temperature, and velocity gradients and their effects on radially resolved emission lines, listing the combinations of plasma conditions that can give rise to signature emission features. Sandia is a multi-program laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Stephanie Hansen
Sandia National Labs

Date submitted: 20 Jul 2009 Electronic form version 1.4