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Time and Space Resolved Synthetic Spectra of a Z-Pinch Stagnation[1] J. GIULIANI, A.L. VELIKOVICH, J.W. THORNHILL, A. DASGUPTA, J.P. APRUZESE, Naval Research Lab., R.W. CLARK, S.T. ZALESAK, Berkeley Res. Assoc., B. JONES, C.A. COVERDALE, Sandia Nat. Lab., C. DEENEY, DOE/NNSA — The stagnation phase of a Z pinch is examined for two alternative scenarios: (i) the reflection of a dense shell off of a hot but low density core, and (ii) the expansion of a shock wave from the axis as it accretes inflowing material. The former case is characteristic of 1D Lagrangian simulations and the latter is an extension of Noh's classic problem. This problem is first used to verify the hydrodynamics of the numerical code in the absence of radiation. Next the simulations for the assembly phase are performed in 1D for an argon pinch with collisional radiative equilibrium for the ionization kinetics and non-local probability-of-escape for the radiation transport. The results are used to produce time and space (radial) resolved synthetic spectra of the He-alpha and inter-combination lines. It is proposed that such spectroscopic observations could discriminate between these two opposing scenarios of a Z-pinch stagnation.

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