Abstract Submitted
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Stagnation of a Gas Puff Z Pinch[1] HENRY STRAUSS, HRS Fusion — Two dimensional MHD computer simulations of the stagnation of a gas puff Z pinch were carried out using an adaptation of the M3D code [1]. The implosion of the Z pinch is driven by a magnetic piston. The piston front is Rayleigh Taylor unstable. Ahead of the magnetic piston is a shock wave, which is stable. The laminar, stable shock reaches the geometric axis and reflects. The high density core plasma expands until it collides with the incoming magnetic piston at the stagnation radius. Thereafter the plasma column contracts, and turbulent motion is transferred to the plasma column, causing it to break up. The kinetic energy in the plasma column decays on the time scale in which the plasma expands to the stagnation radius. Stagnation occurs for $\beta \leq 1$, where β is the ratio of plasma pressure in the column to magnetic pressure outside the column. A simple radiation model is introduced, and the dependence of stagnation radius on radiation and β is determined. Recent measurements [2] are consistent with these results.

[1] W. Park, E.V. Belova, G.Y. Fu, X. Tang, H.R. Strauss, L.E. Sugiyama, Phys. Plasmas 6, 1796 (1999).
[2] E. Kroupp, D. Osin, A. Starobinets, V. Fisher, V. Bernshtam, Y. Maron, I. Uschmann, E. Förster, A. Fisher, and C. Deeney, Phys. Rev. Lett. 98, 115001 (2007).

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Henry Strauss
HRS Fusion

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