Abstract Submitted
for the APR08 Meeting of
The American Physical Society

Breakeven Fusion in a Staged Z-Pinch[1] H.U. RAHMAN, Univ. CA, Irvine, P. NEY, Mt. San Jacinto College, N. ROSTOKER, F.J. WESSEL, Univ. CA, Irvine — We are studying a dense-plasma, Z-pinch configuration, where a cylindrical, Xe shell implodes onto a co-axial, deuterium-tritium target. The configuration is modeled using MACH2. During implosion current amplification occurs at the outer surface of the DT target, leading to a shorter and more energetic implosion (Ref. 1). Shocks preheat and preaccelerate the DT without Rayleigh-Taylor (RT) instability (Ref. 2), even as the Xe liner becomes RT unstable. Proper choice of the initial radius, density, and driver parameters provides a fusion-energy yield larger than the stored (capacitor-bank) energy. A specific example is presented, involving a 2 MJ, 100 ns system that produces a 5 MJ fusion yield. These studies are of interest, since fusion breakeven has yet to be demonstrated in any laboratory experiment.

[1] H. U. Rahman, F. J. Wessel, N. Rostoker, "Staged Z Pinch", Phys. Rev. Lett 74, p. 714(1995).
[2] N. Rostoker and H. Tashiri, A Perspective of Physics Vol. 2, Gordon and Breech, "RT Instability of Impulsively Accelerated Shells", p. 217(1978).

[1]funded by U.S. Department of Energy.

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Date submitted: 14 Jan 2008 Electronic form version 1.4