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Fusion Neutron Production in Deuterium and DT Z-Pinch Implosions with Seeded Axial Magnetic Field at Multi-MA Currents[1] A.L. VELIKOVICH, J. DAVIS, J.L. GIULIANI, Y.K. CHONG, Plasma Physics Division, NRL, R.W. CLARK, S.T. ZALESAK, Berkeley Research Associates, C.A. COVERDALE, D.G. FLICKER, Sandia National Laboratories — We report 1D and 2D numerical and theoretical investigation of the thermal neutron production in deuterium and DT 100-300 ns Z-pinch implosions driven by the currents now accessible on refurbished Z and higher. On-axis plasma compression and thermal fusion neutron yield have been found to increase if D in the outer shell is replaced with a high-Z gas, whose radiative losses make the outer shell thin. With outer-to-inner-shell mass ratio greater than 2, the conventional density gradient/snowplow mechanism of RT instability mitigation becomes ineffective and extra efforts are needed for implosion stabilization. Seeded axial magnetic field ∼20-100 kG can stabilize Ar-on-D implosions at the expense of reducing the neutron yield. Our estimates indicate that thermal DD neutron yields approaching 10^{15} are within the reach in deuterium gas-puff implosions on refurbished Z.

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