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Liner-on-target gas puff Z-pinch experiments on the CESZAR linear transformer driver.[1] FABIO CONTI, APSARA WILLIAMS, VLADIMIR FADEEV, JEFF NARKIS, DAVID REISMAN, MAYLIS DOZIERES, NICHOLAS AYBAR, GILBERT COLLINS IV, FARHAT BEG, University of California, San Diego — Linear Transformer Drivers (LTDs) are pulse generators with low intrinsic impedance and potential for high energy coupling to gas puff Z-pinch loads. The CESZAR LTD, recently commissioned at UC San Diego, is used to drive gas puff Z-pinch experiments at 0.5 MA current levels with a 160 ns rise time. The Z-pinch load consists of a hollow shell (liner) of different materials (H2, O2, Ne, Ar, Kr) and a central D2 jet (target). An external axial magnetic field (Bz) can be pre-embedded in the plasma to mitigate magneto-Rayleigh-Taylor (MRT) instability. We present a parametric study of the pinch performance in terms of Bz0 required for MRT stability, radial convergence, and radiation yield (X-rays from the liner and neutrons from the target) as a function of liner gas species. The Z-pinch implosion is characterized with multiple diagnostics, including time-gated XUV emission images, laser interferometry and schlieren imaging, time-resolved X-ray detectors, time-integrated spectroscopy, and neutron detectors. Magnetohydrodynamic (MHD) simulations are performed for the different configurations and compared with the experimental pinch dynamics, e.g. Bz threshold for MRT mitigation and neutron production.

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