

Abstract Submitted  
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**Coaxial-gun design and testing for the PLX- $\alpha$  Project**<sup>1</sup> F. DOUGLAS WITHERSPOON, SAMUEL BROCKINGTON, ANDREW CASE, EDWARD CRUZ, MARCO LUNA, HyperV Technologies Corp., SAMUEL LANGENDORF, LANL — We describe the Alpha coaxial gun designed for a 60-gun scaling study of spherically imploding plasma liners as a standoff driver for plasma-jet-driven magneto-inertial fusion (PJMIF) [1]. The guns operate over a range of parameters: 0.5-5.0 mg of Ar, Ne, N<sub>2</sub>, Kr, and Xe; 20-60 km/s;  $\sim 2 \times 10^{16}$  cm<sup>-3</sup> muzzle density; and up to 7.5 kJ stored energy per gun. Each coaxial gun incorporates a fast dense gas injection and triggering system, a compact low-weight pfn with integral sparkgap switching, and a contoured gap designed to suppress the blow-by instability [2]. The latest design iteration incorporates a faster more robust gas valve, an improved electrode contour, a custom 600- $\mu$ F, 5-kV pfn, and six inline sparkgap switches operated in parallel. The switch and pfn are mounted directly to the back of the gun and are designed to reduce inductance, cost, and complexity, maximize efficiency and system reliability, and ensure symmetric current flow. We provide a brief overview of the design choices, the projected performance over the parameter ranges mentioned above, and experimental results from testing of the PLX- $\alpha$  coaxial gun. [1] Hsu et al., IEEE Trans. Plasma Sci. **40**, 1287 (2012). [2] Witherspoon et al., Rev. Sci. Instr. **80**, 083506 (2009).

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