Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Coaxial Plasma Gun Development for the ARPA-E PLX-α Project[1] F. DOUGLAS WITHERSPOON, ANDREW CASE, SAMUEL BROCKINGTON, HyperV Technologies Corp. — We describe the renewed effort to design and build coaxial plasma guns [1] appropriate for a scaling study of spherically imploding plasma liners as a standoff magneto-inertial-fusion driver under the ARPA-E Accelerating Low-Cost Plasma Heating And Assembly (ALPHA) program. HyperV joins LANL, UAH, UNM, BNL, and Tech-X to develop, build, operate and analyze a 60 plasma gun experiment using the existing PLX facility [2] at LANL. The guns will be designed to operate over a scaling range of operating parameters: 0.5–5.0 mg of Ar, Ne, N2, Kr, and Xe; 20–60 km/s; $10^{16} - 10^{17}$ cm^{-3} muzzle density; and up to 7.5 kJ stored energy per gun. Each gun is planned to incorporate contoured gaps, fast dense gas injection and triggering, and innovative integral sparkgap switching and pfn configurations to reduce inductance, cost, and complexity, and to increase efficiency and system reliability. We will describe the overall design approach for the guns and pulsed power systems.

[1] Witherspoon et al., Rev. Sci. Instr. **80**, 083506 (2009).
[2] Hsu et al., IEEE Trans. on Plas. Sci. **40**, No. 5, May 2012.

[1]This work supported by the ARPA-E ALPHA Program.

F. Douglas Witherspoon
HyperV Technologies Corp.

Date submitted: 15 Jul 2015 Electronic form version 1.4