

Abstract Submitted
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Plasma Guns for the Plasma Liner Experiment (PLX)¹ F.D. WITHERSPOON, R. BOMGARDNER, A. CASE, S.J. MESSER, S. BROCKINGTON, L. WU, R. ELTON, HyperV Technologies Corp., S.C. HSU, LANL, J.T. CASIBRY, UAH, M.A. GILMORE, UNM, THE PLX TEAM — A spherical array of minirailgun plasma accelerators is planned for the Plasma Liner Experiment (PLX) to be located at LANL. The plasma liner would be formed via merging of 30 dense, high Mach number plasma jets ($n \sim 10^{16-17} \text{ cm}^{-3}$, $M \sim 10-35$, $v \sim 50-70 \text{ km/s}$, $r_{\text{jet}} \sim 5 \text{ cm}$) in a spherically convergent geometry. Small parallel-plate railguns are being developed for this purpose due to their reduced system complexity and cost, with each gun planned to operate at $\sim 300 \text{ kA}$ peak current, and launching up to $\sim 8000 \mu\text{g}$ of high-Z plasma using a $\sim 50 \text{ kJ}$ pfn. We describe experimental development of the minirailguns and their current and projected performance. Fast operating repetitive gas valves have recently been added to allow injection of high density gases including helium, argon, and (eventually) xenon. We will present the latest test results with the high-Z gases, and discuss future plans for augmenting the rails, optimizing the nozzle configuration, preionizing the injected gas, and configuring the pulse forming networks with the capacitors available to the program.

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