

Abstract Submitted  
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**The HyperV Full-Scale Contoured-Gap Coaxial Plasma Railgun** SAMUEL BROCKINGTON, ANDREW CASE, SARAH MESSER, RICHARD BOMGARDNER, RAYMOND ELTON, LINCHUN WU, F. DOUGLAS WITHERSPOON, HyperV Technologies Corp. — HyperV has been developing pulsed plasma injected coaxial railguns with a contoured gap profile designed to mitigate the blowby instability. Previous work using half-scale guns has been successful in launching 150  $\mu\text{g}$  plasmas at 90 km/s [1]. In order to meet the original goal of 200  $\mu\text{g}$  at 200 km/s the full-scale coaxial plasma gun has been constructed, and initial testing is beginning. This new plasma gun consists of two machined aluminum electrodes and a UHMW polyethylene breech insulator. The gun is breech fed by 64 ablative polyethylene capillary discharge units identical to the half-scale gun units. Maximum accelerator energy storage has also been increased 50%. Refractory coatings may be necessary to allow full current ( $\sim 800$  kA) operation. The outer electrode includes 24 small diagnostic ports for optical and magnetic probe access to the plasma inside the gun to allow direct measurement of the plasma armature dynamics. Initial test data from the full-scale coax gun will be presented along with plans for future testing. Work supported by the U.S. DOE Office of Fusion Energy Sciences.

[1] F. D. Witherspoon, A. Case, S. Messer, R. Bomgardner, M. Phillips, S. Brockington, R. Elton, “Contoured Gap Coaxial Plasma Gun with Injected Plasma Armature” Rev. Sci. Instr. submitted (2009)

Samuel Brockington  
HyperV Technologies Corp.

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