Abstract Submitted
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Numerical Simulations of Hypervelocity Plasma Jets[1] M.W. PHILLIPS, F.D. WITHERSPOON, A. CASE, S.J. MESSER, HyperV Technologies Corp., T.P. HUGHES, D.R. WELCH, Voss Scientific, LLC, I.N. BOGATU, S.R. GALKIN, J.S. KIM, FAR-TECH, Inc. — Numerical simulations with comparisons to experiments of hypervelocity plasma jets in development at HyperV Technologies Corp. are presented. The focus will be on the new plasma jet designed to drive rotation in the University of Maryland MCX experiment. Performance of coaxial plasma jets is typically limited by the blow-by instability. Extensive numerical modeling with the Mach 2 code was used in the optimization of the electrode shapes in order to reduce tendencies to blow-by, resulting in a tapered design. To achieve maximum performance each stage of the pulse discharge, including armature formation, acceleration and detachment from the inner electrode, and transport of the plasma blob must be optimized. Experiments have so far demonstrated that plasma blobs of 160 μgrams can be accelerated to 70 km/sec consistent with simulations. Results will also be presented of simulations using the LSP PIC code to study the microphysics of plasma acceleration in more detail.

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