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**Dense Hypervelocity Plasma Jets for Fusion Applications**[1] F. DOUGLAS WITHERSPOON, HyperV Technologies Corp., Y.C. FRANCIS THIO, U.S. DOE — High velocity dense plasma jets are being developed for a variety of fusion applications, including refueling, disruption mitigation, High Energy Density Plasmas, magnetized target/magneto-inertial fusion, injection of angular momentum into centrifugally confined mirrors, and others. The technical goal is to accelerate plasma blobs of density $>10^{17}$ cm$^{-3}$ and total mass >100 micrograms to velocities >200 km/s. The approach utilizes symmetrical injection of very high density plasma into a coaxial EM accelerator having a tailored cross-section that prevents formation of the blow-by instability. AFRL MACH2 modeling identified 2 electrode configurations that produce the desired plasma jet parameters. The injected plasma is generated by up to 64 radially oriented capillary discharges arranged uniformly around the circumference of an angled annular injection section. Initial experimental results are presented in which 8 capillaries are fired in parallel with jitter of ∼100 ns. Current focus is on higher voltage operation to reduce jitter to a few 10's of ns, and development of a suite of optical and spectroscopic plasma diagnostics.

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