Abstract Submitted
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Numerical Simulations of Plasma Jets for PLX L. WU, S. MESSER, A. CASE, HyperV Technologies Corp., M. PHILLIPS, Advanced Energy Systems, F.D. WITHERSPOON, HyperV Technologies Corp., D. WELCH, C. THOMA, Voss Scientific, LLC, I.N. BOGATU, S. GALKIN, J.R. THOMPSON, J.S. KIM, FarTech, J. MACFARLANE, I. GOLOVKIN, Prism Computational Sciences — Two and three-dimensional simulations are performed using the hybrid particle-in-cell code LSP to study liner formation for the Plasma Liner Experiment (PLX). These include studies of plasma transport within small parallel-plate MiniRailguns, issues related to detachment of the jet from the nozzle, and the subsequent propagation of single jets in Cartesian coordinates. Merging of plasma jets is studied mainly in cylindrical coordinates at present. Varied number of railguns (or jets) are used in this study with initial velocity of 50-100 km/s, initial argon number density of 10^{16} cm^{-3} to 10^{17} cm^{-3}, and initial temperature of $\sim$3 eV. The effects on liner formation from jet initial profiles (density, velocity and temperature distribution) are studied to explore behavior. Simulation results are presented and compared with experimental data from merging jet experiments currently being conducted at HyperV using 1cm bore MiniRailguns. The LSP code is used to perform the simulations using improved fluid algorithms and equation-of-state models from Voss and atomic data from Prism. Work supported by the U.S. DOE Office of Fusion Energy Sciences.

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