Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Effects of equation of state, transport, and initial conditions on plasma liner formation and implosion from hypervelocity jets KEVIN SCHILLO, JASON CASSIBRY, Univ of Alabama - Huntsville, ROMAN SAMULYAK, Stony Brook University, SAMUEL LANGENDORF, SCOTT HSU, Los Alamos National Laboratory, PLX-ALPHA TEAM — The PLX-α project is studying plasma liner formation and implosion by merging a spherical array of plasma jets as a standoff driver for magneto-inertial fusion (MIF). A three-dimensional smoothed particle hydrodynamics (SPFMax) code is used to conduct simulations of merging of discrete plasma jets to form a plasma liner and the subsequent implosion of that liner. Peak ram pressure, Mach number, and uniformity of the liner are presented as a function of initial jet properties and assumptions about transport physics. The initial conditions include the number of jets, density, temperature, and implosion velocity. Solid-angle-averaged and standard deviation of liner ram pressure and Mach number reveal variations during liner formation and implosion. Spherical-harmonic mode-number analysis of spherical slices of ram pressure at various radii and times provide a quantitative means to assess the evolution of liner non-uniformity. Comparisons are made with select and equivalent cases of a uniform, imploding liner. Simulations of 6 and 7 jets are provided for select cases to support near-term experiments on PLX-α and will include synthetic spectra and line-integrated densities.

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Date submitted: 16 Jul 2017 Electronic form version 1.4