Abstract Submitted
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Three-Dimensional Modeling of High Beta Magnetized Targets for Plasma-jet-driven Magneto-inertial-fusion (PJMIF)[1] AALAP VYAS, JASON CASSIBRY, SUMONTRO SINHA, UAH Propulsion Research Center, DOUGLAS WITHERSPOON, HyperJet Fusion Corporation, SAMUEL LANGENDORF, Los Alamos National Laboratory — Numerical simulations of compact toroid formation from supersonic plasma jets have been performed using Smooth Particle Fluid with MAXwell equation solver (SPFMax), a smooth particle hydrodynamics (SPH) code supporting the PLX-BETHE project. The physics includes radiation, Braginskii thermal conductivity and ion viscosity, separate ion and electron temperatures, tabular EOS (LTE and non-LTE), nonlocal fusion product deposition, and a novel electromagnetic field solver based on a combination of transmission line theory and Biot-Savart's law. Initial plasma jet conditions are derived from the experimental output of HyperJet-designed plasma guns. Variation in initial velocity, density, temperature, ion species, and formation coil geometry will be explored to assess the plasma beta and lifetime of the magnetic field. Preliminary simulations of 2 or more magnetized plasma jets will be performed to help guide experiments to follow.

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