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Modeling of High Kinetic Energy Plasma Jets for Fusion Applications[1] I.N. BOGATU, S.A. GALKIN, J.S. KIM, FAR-TECH, Inc. — We used semi-analytical models for high velocity (>200 km/s) and density ($>10^{17}$ cm^{-3}) plasma jets to describe the acceleration in coaxial electrodes geometry, the collision, and plasma liner implosion, assuming that jets have merged into a spherical or cylindrical shell. The results are compared with experimental data and are being used for guiding LSP and MACH2 codes simulation and for optimization. The simplest model which uses the adiabatic invariant for oscillator revealed the basic relation between the velocity and the parameters of the plasma accelerator. Plasma slug model was extended for including friction and mass addition by electrode erosion. A simple model of blow-by instability by using the canting angle of the plasma current was formulated. As plasma jets collision at high interfacial Mach number generates shock fronts, we analyzed their possible consequences on the merging process and liner formation. The structure of the spherical shell liner during adiabatic implosion and the effect of the shock wave generated at void closure on the confinement time were also investigated.

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