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Accelerated Taylor Plumes For MIF Targets

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Accelerated Taylor plumes for MIF targets\textsuperscript{1} M.R. BROWN, D.A. SCHAFFNER, H.L. PARKS, A.B. ROCK, Swarthmore College — The SSX plasma device has been converted to a 2.5 $m$ merging plasma wind tunnel configuration. Experiments are underway to study merging and stagnation of high density, helical Taylor states\textsuperscript{2} to employ as a potential target for magneto-inertial fusion. Eventually, SSX Taylor states will be accelerated to over 100 $km/s$ and compressed to small volumes either by stagnation or merging. Initial un-accelerated merging studies produce peak proton densities of $5 \times 10^{15} \, cm^{-3}$. Densities are measured with a precision quadrature He-Ne laser interferometer. Typical merged plasma parameters are $T_i = 20 \, eV, T_e = 10 \, eV, B = 0.4 \, T$ with lifetimes of 100 $\mu$s. Results from a single prototype acceleration coil will be presented, as well as initial simulation studies of Taylor state plasma acceleration using multiple staged, pulsed theta-pinich coils.

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