Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Boundary Condition Effects on Taylor States in SSX[1] JEREMY HAN, JARON SHROCK, MANJIT KAUR, MICHAEL BROWN, Swarthmore College, DAVID SCHAFFNER, Bryn Mawr College — Three different boundary conditions are applied to the SSX 0.15 m diameter plasma wind tunnel and the resultant Taylor states* are characterized. The glass walls of the wind tunnel act as an insulating boundary condition. For the second condition, a flux conserver is wrapped around the tunnel to trap magnetic field lines inside the SSX. For the last condition, the flux conserver is segmented to add theta pinch coils, which will accelerate the plasma. We used resistive stainless steel and copper mesh for the flux conservers, which have soak times of $3\mu s$ and $250\mu s$, respectively. The goal is to increase the speed, temperature, and density of the plasma plume by adding magnetic energy into the system using the coils and compressing the plasma into small volumes by stagnation. The time of flight is measured by using a linear array of magnetic pick-up loops, which track the plasma plume's location as a function of time. The density is measured by precision quadrature He-Ne laser interferometry, and the temperature is measured by ion Doppler spectroscopy. Speed and density without the coils are 30 km/s and 10^{15} cm^{-3}. We will reach a speed of 100 km/s and density of 10^{16} cm^{-3} by adding the coil. *Gray, et al, PRL **110**, 085002 (2013)

[1]Work supported by DOE OFES and ARPA-E ALPHA program

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Date submitted: 15 Jul 2016 Electronic form version 1.4