Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Evolution of the Parallel and Perpendicular Ion Velocity Distribution Function in Pulsed Helicon Plasma Sources Obtained by Time Resolved Laser Induced Fluorescence EARL SCIME, COSTEL BILOIU, XUAN SUN, FOREST DOSS, West Virginia University, EDGAR CHOUERI, ROTISLAV SPEKTOR, Princeton University, JOHN HEARD, Clarion University, DANIEL VENTURA, Univ. Calif. San Diego — The temporal evolution of parallel and perpendicular ion velocity distribution functions (ivdf) in a pulsed, helicon- generated, expanding, argon plasma is presented. The ivdf's temporal evolution during the pulse was determined with time resolved (1 ms resolution), laser induced fluorescence (LIF). The parallel ivdf measurements indicate that, in the expansion region of the plasma and for certain operational parameters, two ion populations exist: a fast moving population moving at supersonic speeds (1.1 Mach) resulting from acceleration in an electric double layer (EDL) and a slow moving population (0.7 Mach) generated by local ionization. After 100 ms, although present, the EDL is not fully developed and has not reached steady state. Measurements of the perpendicular ivdf indicate constant radial expansion, with ion speeds of $\sim$ 400 m/s, in the expansion region.

Earl Scime
WVU

Date submitted: 07 Jul 2005 Electronic form version 1.4