Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Density Profiles in the Irvine Field Reversed Configuration T. ROCHE, F. BRANDI, E.P. GARATE, F. GIAMMANCO, W.W. HEIDBRINK, W.S. HARRIS, R. MCWILLIAMS, E. PAGANINI, E. TRASK, UC Irvine — A mach probe has been used to measure the time-evolved, radial ion density profile and ion flow velocity in the Irvine Field Reversed Configuration (IFRC). The probe consisted of four tungsten tips 0.1mm in diameter and about 1.7mm long. An alumina barrier was placed between 2 of the tips to block ions impinging from opposite directions. The blocked tips were biased 30V negative with respect to the plasma floating potential to draw ion saturation current. The temperature of the ions was measured to be $\sim$10 eV using doppler broadening spectroscopy. Peak densities were measured to be $\sim$5 x 10^{14} cm^{-3}. Flow velocity was measured for the plasma source at 5 x 10^6 cm/s without the presence of magnetic fields. Data gathered during reversal were too noisy to measure the flow velocity of the FRC. These data were compared with two other methods for calculating the density. A CO2 laser interferometer measured a line integrated density of 5 x 10^{15} cm^{-3} over an approximately 10 cm chord length. Previously gathered magnetic field data provided a radial density profile under the assumption of pressure balance. The combination of these two methods verifies both the shape and magnitude of the measured signals. An energy analyzer is being designed to measure the ion velocity distribution function in the IFRC.

Thomas Roche
UCI

Date submitted: 17 Jul 2008 Electronic form version 1.4