

Abstract Submitted  
for the DPP17 Meeting of  
The American Physical Society

**Characterization of the C-2W Plasma Guns** AMI DUBOIS, VLADIMIR SOKOLOV, SERGEY KOREPANOV, DIMA OSIN, Tri Alpha Energy, Inc, GABRIEL PLAYER, Northeastern University, THE TAE TEAM — Previous use of coaxial arc discharge plasma guns on the C-2U device exhibited great success in plasma stabilization and improved confinement. On the C-2W experiment, arc discharge plasma guns will again be used to facilitate the electrical connection between the plasma core and the divertor electrodes in order to maintain the electrode edge biasing and induce  $E \times B$  shear to control plasma rotation. Each plasma gun contains an internal solenoid used to shape the plasma stream. Characterization of electron density ( $n_e$ ), electron temperature ( $T_e$ ), floating potential ( $V_f$ ), and total plasma flux in an arc discharge lasting 6 ms without the internal solenoid are presented. A Langmuir probe located 27 cm axially outside of the plasma gun anode measures a bell-like radial  $n_e$  profile with peak  $n_e \sim 10^{18} \text{ m}^{-3}$  and  $T_e \sim 2 - 10 \text{ eV}$ . Observed spectral lines of impurity ions provide an estimate of  $T_e$ , and Balmer series line ratios of the main ion component are used to evaluate  $n_e$  at both the probe location and near the plasma gun anode. A calorimeter measures the plasma flux to be constant and equivalent to 1 kA.

Ami DuBois  
Tri Alpha Energy, Inc

Date submitted: 13 Jul 2017

Electronic form version 1.4