Plasma transport Simulation in Field Reversal Configuration
SANGEETA GUPTA, SEAN DETTRICK, D.C. BARNES, Tri Alpha Energy, TAE TEAM — A Quasi-1D (Q1D) transport code was developed at Tri Alpha for predicting and interpreting the macroscopic time evolution of FRC plasmas in the C-2 field-reversed configuration experiment [1]. Q1D solves the time dependent radial transport equations for multiple ions species with rotation, representing the midplane of an experimental device. In the closed field region, important 2-D effects are incorporated in the Q1D code by transfer of particles, angular momentum and energy from inside to outside flux surfaces as well as axial length change in response to axial force balance. The closed field region is coupled with the SOL (Scrape Off layer) region by using the one-point parallel loss model. Parallel heat conduction is used as the dominant mechanism for electron heat transport in the SOL region while convective loss is used for parallel particle transport. Numerical results with C-2 relevant parameters will be presented and shown to be in reasonable agreement with experiments.

[1] M. W. Binderbauer *et al*, Phys.Rev.Lett. **105,** 045003 (2010).