Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Gyro-Scale Turbulence in the C-2 Field Reversed Configuration L. SCHMITZ, University of California Los Angeles, B. DENG, H. GOTA, T. TAJIMA, D. GUPTA, J. DOUGLASS, M. BINDERBAUER, Tri Alpha Energy, Inc., E. RUSKOV, University of California Irvine, THE TAE TEAM — Short-scale electron-mode turbulence ($0.5 \leq k_\theta \rho_s \leq 40$; where k_θ is the toroidal wavenumber and ρ_s is the ion sound gyroradius) has been observed in the C-2 FRC via multi-channel Doppler Backscattering. Density fluctuation levels $\tilde{n}/n$ are substantial near the separatrix and in the scrape-off layer (SOL) plasma, and very low in the FRC core. Turbulent structures are observed to propagate radially outwards from the separatrix into the SOL. SOL fluctuation levels are reduced by a large factor ($\leq$10) at high mirror plug ratio (R_p =20), with concomitant improvements in FRC particle and energy confinement. Reduced radial correlation lengths ($\lambda_c < \rho_s$) and turbulence decorrelation rates are measured near the separatrix. A non-monotonic toroidal wavenumber spectrum is observed in the FRC core ($\tilde{n}/n$ *increases* with toroidal wavenumber for $k_\theta \rho_s \leq 10$ and *decreases* exponentially for high $k_\theta \rho_s$). These observations are qualitatively consistent with quenching of long wavelength ion modes via $\boldsymbol{E}$x$\boldsymbol{B}$ velocity shear or Finite Larmor radius effects, and dominant residual electron-mode core plasma turbulence.

Lothar Schmitz
University of California Los Angeles

Date submitted: 11 Jul 2014 Electronic form version 1.4