Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Density Fluctuation and Edge Profile Measurements at the TAE Field Reversed Configuration Machine EMIL RUSKOV, TAE Inc., LOTHAR SCHMITZ, LEI ZENG, TONY PEEBLES , UCLA, BIHE DENG, TAE Inc., TAE - UCLA COLLABORATION — Microwave reflectometry/Doppler Backscattering (DBS) is used for the first time to probe density fluctuations in a FRC plasma. A six channel tunable heterodyne system coupled to monostatic beam optics and a steerable parabolic mirror launches X/O-mode waves (26-90 GHz) towards the C-2 FRC plasma [1]. At oblique incidence, DBS is used to measure density turbulence with $k_\theta \rho_i < 4$. Turbulence levels increase with radius and are correlated with the density gradient: they are large in the SOL, and small near the field null. Recently, a dedicated, fast swept profile reflectometer was developed for measurement of the edge density profile in the 0.3-2.2x10^{13} cm^{-3} range, with 2.5 μs maximum time resolution. The challenging requirements were solved with a bistatic two-band design, a specialized fast varactor-tuned source, and very fast data acquisition using a 1 Gs/s LeCroy oscilloscope. Sample edge density profiles, their comparison with the wings of CO2 interferometer profiles, and some physics implications will be discussed.

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

Emil Ruskov
TAE Inc.

Date submitted: 14 Jul 2011 Electronic form version 1.4