Abstract Submitted for the Forty-Eighth Annual Meeting
Division of Plasma Physics
October 30th-November 3, 2006, Philadelphia, Pennsylvania

Category Number and Subject: 5.6.2. DIII-D Tokamak

[ ] Theory [X] Experiment

New Diagnostic for Doppler Reflectometry and Correlation Measurements of Electron Temperature and Density Fluctuations in DIII-D,* L. Schmitz, A.E. White, T.A. Carter, W.A. Peebles, T.L. Rhodes, G. Wang, *UCLA,* M.E. Austin, *UT-Austin* – Local fluctuation measurements are required to evaluate the importance of different turbulent transport channels. Doppler reflectometry at 50-65 GHz is employed to measure the density fluctuation spectrum and the ExB flow velocity in DIII-D. A parabolic mirror is used to achieve a narrow beam spot size ($W_0 \sim$ 2.5 cm). The plasma flow velocity is obtained from the measured Doppler frequency shift f_D of the received signal: $v_\perp = f_D \lambda_0/(2 \sin \theta)$, where θ is the antenna tilt angle (7-15 degrees). An ECE correlation technique is used to extract electron temperature fluctuations (described in detail [1]). By matching the reflectometer X/O-mode cut-off to a particular ECE emission location, we expect that the correlation and relative phase $\phi_{T,n}$ of electron temperature and density fluctuations can be measured in quiescent plasmas (QH-mode). Quantitative comparisons of the measured $\tilde{n}$, $\tilde{T}$, and $\phi_{T,n}$ with gyrokinetic code results are now feasible.

[1] A.E. White, et al., this conference.

*Supported by the US DOE under DE-FG02-01ER54615 and DE-FG03-97ER54415.