Abstract Submitted
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New Diagnostic for Doppler Reflectometry and Correlation Measurements of Electron Temperature and Density Fluctuations in DIII-D,[1] 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 deg). 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.

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