TURBULENCE – MEASUREMENTS & COMPARISONS

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Fast-sweeping reflectometry in extraordinary mode allows direct measurement of radial wavenumber local spectra $S[\delta n/n](k_r, r)$ and radial profiles of density fluctuations $\delta n/n(r)$. Absolute density fluctuations profiles are then routinely available on Tore Supra tokamak [1].

A full overview of the extraction method – based on closed-loop comparisons between experimental signals and its reconstruction using a 1D fullwave propagation code – will be presented. Focus will be set on the usefulness of the wavelet-based approach. This mathematical tool for position-frequency analysis allows the strong radial variations of the measured phases to be properly treated.

Special consideration will be given to the validation of spectra and turbulent profiles measurements, by comparing with experimental measurements (reflectometries, probes) and numerical simulations [2] performed with non-linear gyrokinetic GYRO [3].

References

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[3] J. Candy and R. E. Waltz, Phys. Rev. Lett. 91, 45001 (2003)