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Interpreting Radial Correlation Doppler Reflectometry using Gyrokinetic Simulation[1] J. RUIZ RUIZ, F. I. PARRA, M. BARNES, N. CHRISTEN, Oxford, C. GIROUD, J.C. HILLESHEIM, CCFE, J. CANDY, GA, J. GARCIA, CEA, W. GUTTENFELDER, Y. REN, PPPL, C. HOLLAND, UCSD, D.R. SMITH, UW-Madison, N.T. HOWARD, A. E. WHITE, MIT — Radial correlation Doppler reflectometry (RCDR) is routinely used to extract the radial correlation length of the turbulence in magnetic confinement devices, but open questions remain in the interpretation of the measured values. Measurements [1] have shown radial correlation lengths exceeding the ion gyro-radius, however DBS is routinely sensitive to intermediate to high-k e- scale fluctuations. This offers several interpretations from the measurement and the underlying turbulence. We present a conceptual study of RCDR using nonlinear gyrokinetic simulations from GYRO and GS2 based on NSTX H-mode and JET L-mode discharges. The turbulence radial correlation length is compared to correlation lengths computed using a synthetic RCDR. The width of the probe beam and the measured wavenumber are shown to be critical parameters determining the RCDR correlation length. The tilt angle of turbulent eddies in the poloidal plane [2] is strongly influenced by Doppler shift and ExB shear. The ultimate goal is to characterize the presence of ITG vs. ETG-driven turbulence through RCDR. [1] Schirmer PPCF 2007, [2] Pinzon NF 2019.

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J. Ruiz Ruiz
Oxford

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