

Overview of JET Correlation Reflectometry Systems and Results

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During the past few years, several changes were introduced in the JET Correlation Reflectometry Systems (KG8b) [1], reducing the losses in the waveguides with the introduction of new transmission corrugated waveguides [2] and improvements in the Data Acquisition Systems. Also, recently a new quasi optical arrange in order to share the waveguides with the new Sweeping Reflectometers Systems KG8a [3] and KG10 [4], was implemented. These changes have strong effects on the Correlation Reflectometry signals quality and also introduce some issues in the interpretation of the data analyses. As a consequence of these changes, an undesired phase imbalances in the KG8b signals can be introduced. To mitigate these imbalances and correct them, an in-situ method for the calibration of the Correlation Reflectometry Systems on the JET Tokamak was recently implemented. Using this procedure, all four Correlation Reflectometers can be calibrated simultaneously and their phase deviations, amplitude imbalances and DC offsets routinely corrected. On the other hand the correct determination of the correlation length of the density fluctuations (radial distance between two wave probes where the coherency takes a value of $1/e$), requires precise density profile measurements. The simulation results from Girokinetic code [5], based on the experimental observations of JET Correlation Reflectometry Systems, shows that the correlation length of turbulence is few centimeters in L-mode plasma on JET. Local density measurements with a spatial resolution below the values of correlation length of turbulence at the plasma core are expected to be provided by the new KG10 Sweeping Reflectometer. An overview of the results obtained at JET will be presented in the Workshop.

[1] - S. Hacquin et al, Rev. Sci. Instrum., 75, (2004).

[2] – Cupido L. et. al., Fusion Eng. and Design, 74, (2005).

[3] – Meneses L. et al, Rev. Sci. Instrum., (10) 79, (2008).

[4] – A. Sirinelli et. al., to be presented in this Workshop, (2009).

[5] – R. Budny et. al, 49th APS Conference, November 12–16, Orlando, (2007).