2D mappings of ICRF-induced SOL density modifications on JET

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Localized Scrape-Off Layer (SOL) modifications have for long been evidenced on open magnetic field lines near active Ion Cyclotron (IC) wave launchers. These changes were shown to influence the reflection coefficient of Lower Hybrid grills, the first wall sputtering and heat loads. However, resolving their complex 3D spatial structure remains challenging.

This contribution investigates SOL density distributions, measured on JET by Lithium beam emission spectroscopy and X-mode reflectometry. Assuming a parallel homogeneity of the IC-induced SOL patterns, the ratio of density with or without IC waves was plotted *versus* the location of observation points along the diagnostic lines of sight, mapped in front of each IC antenna. This technique was applied to L-mode pulses where the JET A2 and ITER-like antennas were toggled over a scan of the edge safety factor. 2D (radial/poloidal) maps were thus produced for each diagnostic/antenna pair, for current-drive strap phasing.

The IC-induced relative density changes, reproducible from pulse to pulse, are most pronounced when the diagnostics magnetically connect in front of active IC launcher mouths. They are radially localized near antenna side limiters and extend a few cm in front of them, remaining 2-3cm outside the separatrix. They are poloidally inhomogeneous: density depletion is generally observed, but the density also increased locally above one A2 antenna.

Reproducing the parallel extent, the radial width and poloidal asymmetry of the observed SOL patterns puts constraints on RF-sheath modelling. Assuming that IC-specific sputtering occurs on wall elements connecting to the flux tubes with modified density, the maps outline possible locations for IC-induced W sources that could not yet be evidenced directly on JET.

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