Experimental analysis of carbon penetration in the DED experiments on Textor.

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The purpose of the work reported here is to characterise the DED configuration in terms of its capability to control the intrinsic impurity sources, C and O, and to control the penetration of the produced impurity neutrals into the confined plasma. Similar work on this topic has been done in Tore Supra with the ergodic divertor [1]. Two series of experiments with the DED on Textor are analysed, in the 3/1 or 12/4 mode operation. The C penetration is analysed from two 2D CCD cameras [2], one with a tangential view, and the other one with a direct view to the DED coils. The two CCD cameras are equipped with a CIII interference filter.

In parallel with the experimental analysis, the magnetic perturbation and magnetic spectra are calculated together with the value of the Chirikov parameter in these DED experiments. The ionisation length of C neutrals (λ_i) is estimated from the local density and temperature measurements from fixed Langmuir probes, and from an estimation of the energy of the produced neutrals, and λ_i is compared to the width of the edge region where the Chirikov parameter is larger than one.

[1] Y. Corre, PhD Thesis, 2001.

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