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# Modelling with the 2D Multifluid Code TECXY of TEXTOR Discharges in the Presence of DED

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A study of the influence of the Dynamic Ergodic Divertor on transport and radiation of intrinsic carbon is in progress at TEXTOR, involving calculations with the 2D multifluid code TECXY and experimental data from spectroscopic diagnostics.

The brilliances of CII, CIII and CV lines in the visible and UV range are detected simultaneously along a set of nine lines of sight distributed over a significant fraction of the poloidal angle near the High Field Side (HFS) where the coils of the ergodic divertor are located. This allows to investigate the radiation properties of carbon and the contamination of the main plasma for a variety of experimental conditions.

The physical model in the TECXY code is based on Braginskij-like equations for the background plasma and rate equations for the impurity ions. The code incorporates drift motions and currents in a fully self-consistent way. The increased radial transport in the stochastic magnetic field is calculated according to a model of "optimal paths", which leads to analytical formulae involving the field line diffusion coefficient and the Kolmogorov length.

Two DED operational modes (m/n = 12/4 and 3/1), resonant at the q = 3 surface, have been studied so far. In contrast to modes with lower m the radial decay length of the 12/4 mode is very short. In order to maximize the field penetration, the plasma column has to be shifted horizontally towards the HFS. This implies a change on the location of recycling and of impurity source (main plasma sink at the ALTII limiter is replaced by the sink at the DED surface), which affects drastically the poloidal asymmetries in the plasma edge. In fact, results of calculations show that the effect of plasma shift is of major importance. For the shifted plasma the effect of DED currents (stochastic transport) is investigated in detail. We also consider cases with the DED in the shadow of the ALTII limiter, which to some extent refers to 3/1 mode DED operation.

Preliminary comparison of modelling with experimental measurements shows qualitative agreement. In particular we compare edge plasma simulations with carbon lines and bremstrahlung radiation.