

Comparative analysis of the SOL properties for the various magnetic configurations proposed for the DEMO divertor

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The mitigating properties of the divertor advanced magnetic configurations on the target heat load have been analysed with the 2D edge code TECXY for the European DEMO. Particular emphasis is put on the snowflake minus, for which several variants have been proposed just to study this particular effect, where the distance between the two X points, the primary and secondary ones, is varied. In such a way the magnetic topology in the outboard part of the divertor is varied and regions with low poloidal field and then much longer connection length are created with different extension and localization with respect to the primary X point. The scenario considered is a low density one, without any added impurity in order to keep at a negligible level the effect of radiative volume losses and then to ascribe any possible change to the transport properties of each configuration. A significant widening of the power flow channel in term of the poloidal flux coordinate, i.e. independent of any expansion effect, is found and correspondingly a drop of the peak power load. The mitigation effect increases for these configurations that more affect the region in close touch with the main separatrix. The possible causes for this effect are discussed in the paper. However some manipulation is required to make the real magnetic topology compatible with the constraints of TECXY, which allows for only two targets. Even if the modifications affect only the more external flux tubes that have less weight in the power transport, the results clearly claim for confirmation by other more complex codes.

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