

P5.1020 Analysis of W transport in ASDEX Upgrade during various pedestal activities

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See full abstract here:

<http://ocs.ciemat.es/EPS2019ABS/pdf/P5.1020.pdf>

Edge transport barrier (ETB or pedestal) regime is often associated with transient relaxations (Edge Localized Modes or ELMs) of the plasma. These periodic bursts of particles and energy can significantly erode and damage the materials (eg. Tungsten, W) of the tokamak vessel. Any high-Z impurities remaining confined in the plasma may potentially contribute to decrease the overall confinement time by radiating part of the heating power mostly via line-emission radiation (and Bremsstrahlung at higher temperatures). When impurities accumulate in the core, they can eventually cause the disruption of the plasma and the abrupt end of the confinement.

We compare results from recent ASDEX Upgrade experiments in various ELMs regimes (type I or type III). Spectroscopic measurements give an indication of the W source evolution with heating and ELM activity. Measurements from the grazing incidence spectrometer [1] are analysed in order to assess the W content of the confined plasma in colder (~ 1.5 keV) and warmer (~ 2.5 keV) regions. Both ELMs cycles maintain a constant impurity level but type III discharges exhibit much less W content due to decreased physical sputtering. RMPs (Resonant Magnetic Perturbation coils) alter the plasma edges and decrease the peaking of the W-content through plasma rotation breaking. Tomographic reconstructions [2] of the Soft X-Ray (SXR) emission are used to assess the effect of plasma rotation on the degree of poloidal asymmetry [3] in the distribution of the tungsten. Planned experiments in ASDEX Upgrade dedicated to W transport studies are introduced.

[1] T. Pütterich et al. J. Phys. B: At. Mol. Opt. Phys. 38 (2005) 3071-3082

[2] T. Odstrcil et al. Rev. Sci. Instrum. 87, 123505 (2016);

[3] T. Odstrcil et al. 2018 Plasma Phys. Control. Fusion 60 014003

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