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EX/P3-15: Tungsten Screening and Impurity Control in JET

Wednesday, 10 October 2012 08:30 (4 hours)

For the ITER-like wall at JET, the screening of the divertor W source is investigated along with possibilities to influence the central metal transport. From visible spectroscopy the erosion fluxes of W are determined at the outer strike line, which intersects the horizontal, solid tungsten target tile. The W-fluxes as determined by visible spectroscopy are related to the W-content in the main plasma, which is derived from VUV spectroscopy, in order to obtain an effective W confinement time tau_W. The investigations have been performed in low- and high-triangularity H-mode discharges at 2.0MA and 2.5MA, while a deuterium fuelling gas puff has been varied from shot to shot. Both the W-erosion in the divertor and the W-screening behave beneficial for increasing gas puff, i.e. the erosion decreases and tau_W decreases. Thus, an increasing gas puff leads to a strong reduction of the W-content in all investigated H-mode plasmas. Important players for this behaviour are the divertor electron temperature, the SOL and plasma edge transport and the ELM frequency. While the absolute numbers for the W-concentrations are very low (a few 1E-6), impurity accumulation is observed for cases without any gas puff. This behaviour is discussed also considering the influence of other metal impurities. Independent of the radiating species, it is explored to what extent central wave heating (ICRH and LH) and impurity avoidance strategies, i.e. gas puffing and ELM-pace-making, help to avoid impurity accumulation.

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Collaboration (if applicable, e.g., International Tokamak Physics Activities)

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