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Tungsten in the divertor of DIII-D: effect of material choice on intrinsic fuel source on ELM time scale[1] I BYKOV, E HOLLMANN, UCSD, M GROTH, Aalto Univ, A PIGAROV, UCSD, J GUTERL, ORAU, D RUDAKOV, UCSD, H WANG, GA, J WATKINS, SNL, CH LASNIER, A MCLEAN, LLNL, T ABRAMS, D THOMAS, GA — Significant advances have been made in understanding fuel recycling and sourcing from a W-coated divertor in DIII-D during the Metal Rings Campaign (MRC). Simultaneous measurements of D atoms and D_2 molecules recycling at the Outer Strike Point (OSP) enabled the quantification of the relative contribution (F) of D atoms to the total recycling flux on tungsten. Between ELMs, F˜40%, consistent with expectations if all atomic recycling is due to reflections. In an opaque SOL of a larger tokamak such as ITER, the fast reflected D may dominate the intrinsic fueling of the pedestal because the low energy neutrals will be screened in the divertor. During ELMs, F increased to 60%. This effect was studied in a DiMES experiment with a variety of metal samples (Mo, W, W fuzz, and Ti). In L-mode DiMES was biased to vary the ion impact energy, E_i, to simulate the effect of ELMs in controlled conditions. On all samples an increase of E_i led to a transient increase of the recycling fraction, similar to the MRC results.\pardThe fueling efficiency of the neutral D source in the divertor depends on the flux and the energy of the D reflected from the target. Therefore, the properties of the target material are crucial in controlling the source of divertor D available for edge fueling. During the MRC, a relatively small divertor target area (0.6% of the total wall area) covered in W led to an 8% edge n_e increase with OSP placed on W in L-mode, qualitatively consistent with EDGE2D-EIRENE. However, the effect of W on H-mode edge profiles in DIII-D was small.

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