Abstract Submitted
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Measurements and modeling of intra-ELM tungsten sourcing and transport in DIII-D[1] T. ABRAMS, A.W. LEONARD, D.M. THOMAS, GA, A.G. MCLEAN, M.A. MAKOWSKI, LLNL, H.Q. WANG, ORAU, E.A. UNTERBERG, A.R. BRIESEMEISTER, ORNL, D.L. RUDAKOV, I. BYKOV, UCSD, D. DONOVAN, UTK — Intra-ELM tungsten erosion profiles in the DIII-D divertor, acquired via W I spectroscopy with high temporal and spatial resolution, are consistent with SDTrim.SP sputtering modeling using measured ion saturation currents and impact energies during ELMs as input and an ad-hoc 2% C^{2+} impurity flux. The W sputtering profile peaks close to the OSP both during and between ELMs in the favorable B_T direction. In reverse B_T the W source peaks close to the OSP between ELMs but strongly broadens and shifts outboard during ELMs, heuristically consistent with radially outward ion transport via ExB drifts. Ion impact energies during ELMs (inferred taking the ratio of divertor heat flux to the ion saturation current) are found to be approximately equal to $T_{e,ped}$, lower than the $4*T_{e,ped}$ value predicted by the Fundamenski/Moulton free streaming model. These impact energies imply both D main ions and C impurities contribute strongly to W sputtering during ELMs on DIII-D. This work represents progress towards a predictive model to link upstream conditions (i.e., pedestal height) and SOL impurity levels to the ELM-induced W impurity source at both the strike-point and far-target regions in the ITER divertor. Correlations between ELM size/frequency and SOL W fluxes measured via a midplane deposition probe will also be presented.

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Tyler Abrams
General Atomics

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