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The key role of ExB drifts in W impurity transport and redeposition in the DIII-D divertor[1] J.H. NICHOLS, D.C. DONOVAN, J.D. DURAN, S.A. ZAMPERINI, UTK, T. ABRAMS, GA, J.D. ELDER, P.C. STANGEBY, UTIAS, D.L. RUDAKOV, UCSD, K. SCHMID, IPP Garching, E.A. UNTERBERG, ORNL, W.R. WAMPLER, SNL — Mixed-material DIVIMP-WallDYN modelling, now incorporating ExB drifts, is presented that is consistent within a factor of 2 with tungsten (W) erosion and deposition patterns observed during L-mode experiments in DIII-D with toroidally symmetric W-coated tiles installed in the carbon (C) divertor. It is demonstrated that ExB drifts are required to reproduce the experimental observations, and that the spatial structure of modelled divertor poloidal ExB drifts correlates with boundaries of the observed deposition/erosion regions. With attached L-mode conditions and ion grad-B drift out of the divertor, W and C co-accumulation is observed over a band located ˜5-8 cm outboard of the outer-strike-point (OSP) W source, but little W is observed closer to the OSP. Time-dependent simulations with modified ExB impurity drifts (set to 60% of the calculated value) quantitatively reproduce these features, including depth-resolved W/C ratios, within a factor of 2 over ˜110 seconds of plasma exposure. These simulations indicate that ExB transport can dominate over parallel force balance for W in the divertor region. This represents the first self-consistent modeling of global W redeposition in a C divertor with W targets.

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