Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

SOLPS + DIVIMP studies of impurity accumulation near the outside midplane separatrix[1] J. DAVID ELDER, PETER STANGEBY, University of Toronto, XAVIER BONNIN, ITER, JOHN CANIK, JEREMY LORE, ORNL, DAVID MOULTON, UKAEA-CCFE, JACOB NICHOLS, University of Tennessee, Knoxville, RICHARD PITTS, ITER — SOLPS code studies of ITER cases find impurity accumulation near the outside midplane (OMP) separatrix. Since the impurity density, n_z, there is the boundary value for the core n_z this effect is of potential significance. The effect also appears to be fairly robust. SOLPS case 2316 is detached at both targets for the flux tubes near the separatrix; case 2408 is attached at the outer and detached at the inner target. Nevertheless, for both cases a n_{Ne}^{10+} peak of almost the same magnitude occurs. The neon enrichment there is <1 since the concentration, n_{Ne}^{total}/n_e, at the OMP is greater than the divertor concentration; however, the compression is >1 since n_{Ne}^{total} is higher in the divertor. As the computational time to reach converged SOLPS solutions is long, it is difficult to explore the controlling physics involved. The DIVIMP code has been used to launch Ne into the SOLPS-calculated 'plasma background' for cases 2316, 2408. The value of $D_\perp$ was changed from the SOLPS value of 0.3 m^2/s to 1, and also to 0.1, while keeping the number of injected Ne particles fixed. For 0.3 $\rightarrow$ 1 m^2/s the n_{Ne}^{10+} peak value decreased by ˜2X, while for 0.3 $\rightarrow$ 0.1 m^2/s it increased by ˜2X. It is shown that these results are broadly in accord with a simple fluid model for impurities.

[1]Work supported by US DOE under DE-AC05-00OR22725

David Elder
University of Toronto

Date submitted: 28 Jun 2019 Electronic form version 1.4