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DIVIMP-R code tests of an analytic model of impurity leakage from the divertor and accumulation in the main scrape-off layer[1] DAVID ELDER, PETER STANGEBY, Univ of Toronto — Edge codes like SOLPS find spatial distributions of impurity density, nz, which are quite non-uniform. Often nz peaks strongly near the targets and on/near the separatrix at the outside midplane, OMP. High nz of low-Z near the targets is desirable for efficient edge radiative dissipation. High nz of high-Z near the OMP is undesirable for confined plasma performance. SOLPS etc. have grown so sophisticated that they can benefit from interpretation in terms of simple conceptual frameworks. A simple analytic 1D impurity fluid model, 1DImpFM, has been developed for the transport along open field lines of impurity ions in a specified fuel-plasma background [1; Stangeby & Moulton, 2020, NF]. An nz peak at/near the OMP occurs at an impurity stagnation point, ISP, where v_$z_{||}$ and flux_$z_{||}$ ->0. 1DImpFM predicts that nz-peaking will only occur if, in approaching the ISP v_$z_{||}$ starts to decrease before flux_z||does. It is hypothesized in [1] that the latter happens because of a natural feedback effect between parallel and cross-field impurity fluxes. The 2D DIVIMP-R (Rectilinear) code has been developed to test this hypothesis. The code finds, as hypothesized, that v_$z_{||}$ drops before the flux_$z_{||}$ does, resulting in an increase in nz. Additional results are presented.

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