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Validating the SOLPS-ITER drift model using C-Mod data

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To develop practical tokamak fusion reactors, accurate edge plasma transport modeling is critical. The need to properly model impurity transport is particularly acute: injected impurities are necessary to dissipate exhaust power to a level that ensures survival of divertor targets, while also limiting unwanted core impurity contamination. The advanced capability of the SOLPS-ITER code to capture plasma drifts has made it a focal point of the tokamak community. On the Alcator C-Mod tokamak, exceptionally well-diagnosed H-mode experiments with impurity injection have been performed. Available diagnostics include upstream Thomson scattering, target Langmuir probes, divertor neutral pressure, multi-channel spectroscopy, and bolometry. SOLPS-ITER is applied to a 5.4 T, q_{95}=4.9 EDA H-mode with $q_{||}$ up to 0.4 GW m^{-2}, which has quasi-steady phases with and without toroidally symmetric private flux region N_2 injection. Initial results for the phase without N_2 show clearly that drifts are needed to recover measured edge plasma profiles. Progress on modeling with drifts and with nitrogen injection will be reported.

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