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Investigating synergy between closed slot structure and EB drifts influencing divertor detachment in DIII-D small angle slot divertor using SOLPS-ITER code[1] XINXING MA, General Atomics - San Diego, HUIQIAN WANG, HOUYANG GUO, General Atomis, PETER STANGEBY, University of Toronto, ERIC MEIER, Zap Energy Inc., ANTHONY LEONARD, DAN THOMAS, General Atomics — Experiments in DIII-D and SOLPS-ITER simulations with full EB drifts show a strong interplay between drifts and divertor geometry on divertor detachment. For the ion $\mathbf{B}\nabla$B drift away from the X-point ('unfavorable-B_φ'), cold plasma with T_e <10 eV across the entire SAS divertor target can be achieved at very low main plasma densities. In contrast, for the ion $\mathbf{B}\nabla$B drift toward the X-point ('favourable-B_φ'), the divertor plasma remains hot and attached across the entire target plate until the eventual onset of detachment, at a much higher density, similar to other divertors in DIII-D. The analysis shows that for unfavorable-B_φ, the EB drifts carry particles from the inner divertor into the outer common flux region (CFR) via the private flux region (PFR), reinforcing the anticipated geometry effect of SAS, facilitating divertor detachment. While for favorable-B_φ, the EB drifts drive particles out of the outer divertor via PFR, offsetting the anticipated geometric effects. The modelling also predicts a higher neutral density near the target at lower main plasma densities with unfavorable-B_φ, compared with unfavorable-B_φ. These results indicate that at least for DIII-D scale devices, divertor geometry and drifts have comparable magnitude effects on the divertor plasma.

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