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Impact of Cross-field Drifts on Detachment in DIII-D[1] A.E. JAERVINEN, S.L. ALLEN, A.G. MCLEAN, T.D. ROGNLIEN, C.M. SAMUELL, G.D. PORTER, LLNL, M. GROTH, Aalto, D.N. HILL, A.W. LEONARD, GA — Simulations of DIII-D plasmas have revealed the strong role of $\mathbf{E}\times\mathbf{B}$-drifts in the low field side (LFS) detachment structure. High confinement modes (H-mode) with the ∇B-drift towards the X-point (fwd B_T) enter detachment at 20% higher upstream density, $n_{e,sep}$, than plasmas with the ∇B-drift away from the X-point (rev B_T). In contrast, low confinement modes (L-mode) enter detachment at 10% lower $n_{e,sep}$ in fwd B_T. Despite this, both L- and H-modes detached plasmas show strong target flux, J_{SAT}, reduction with increasing $n_{e,sep}$ in fwd B_T, while only a modest reduction occurs in rev B_T. In fwd B_T H-mode, a step-wise transition from attached to strongly detached conditions is observed with increasing ne,sep. UEDGE simulations indicate that the strong poloidal $\mathbf{E}\times\mathbf{B}$-drift in the private flux region in H-mode drives the difference for the detachment onset relative to L-mode. In fwd B_T, the dependence of this poloidal $\mathbf{E}\times\mathbf{B}$-drift on the divertor conditions can reinforce the plasma into either attached or strongly detached state. In rev B_T, radial $\mathbf{E}\times\mathbf{B}$-drift depletes strike-line n_e, limiting the degree of detachment.

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