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Simulations of divertor plasmas with inverse sheaths[1] REBECCA MASLINE, ROMAN SMIRNOV, SERGEI KRASHENINNIKOV, University of California, San Diego — The effect of strong electron emission from material surfaces has been proposed to form an inverse sheath: a region with positive potential relative to the plasma edge which prevents the flow of ions to the wall. We assess the viability of this regime in a tokamak device using the 2D edge plasma transport code UEDGE. Since the UEDGE code does not consider the sheath region directly, we apply boundary conditions at the divertor targets which emulate the physics of both "standard" and "inverse" sheath regimes. Using these boundary conditions, we perform scoping studies to assess plasma parameters near the target by varying the density at the core-edge interface. We observe a smooth transition in the resultant profiles of plasma parameters for the standard sheath, and a bifurcation across the simulation set for plasmas with an inverse sheath. The cause of this bifurcation is assessed by performing the parameter scan both with and without impurity radiation; we observe that the bifurcation persists in both cases, indicating that this bifurcation is caused by plasma recombination.

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