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Modeling of parallel transport and dissipation processes leading to detachment in DIII-D[1] J.D. LORE, J.M. CANIK, A. BRIESEMEISTER, ORNL, A.W. LEONARD, GA, A. MCLEAN, LLNL — A series of deuterium plasmas on DIII-D with extensive edge diagnostic coverage are simulated using the SOLPS-ITER code to validate processes leading to detached divertor conditions. The simulations will be used to quantify factors associated with an observed over prediction of the divertor electron temperature when matching upstream densities for detached cases, including parallel pressure and power losses and sources of divertor radiation. The detachment onset discrepancy is related to the deficit in outer divertor radiation found in fluid plasma edge modeling as compared to experiment, resulting in divertor conditions that are hotter and less dense than experiment when the upstream profiles are matched. Here modeling is performed using cross-field diffusivities chosen to match the ITPA scrape-off-layer heat flux width scaling and the separatrix temperature from experimental power balance. The simulation data are then compared to all available boundary diagnostics with the goal of quantifying the discrepancies and identifying the primary contributing processes.

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