

ABSTRACT

A series of controlled experiments has been carried out in DIII-D to induce a bulk ion flow in the scrape-off layer (SOL) and evaluate its effect on the localization of impurities in the divertor. This induced SOL flow was created by simultaneous deuterium puffing and divertor exhaust using a divertor cryopump and the impurity enrichment was measured directly. The experiments were designed to compare enrichment in discharges with and without induced flow having otherwise similar divertor parameters. Significant increases in impurity compression and enrichment are observed when flow is induced, and the degree of impurity enrichment in the divertor is found to be dependent on the impurity of interest. Detailed particle measurements made possible by the direct measurement of impurity densities in several reservoirs indicate reasonable particle balance for helium throughout the duration of the discharge. Conversely, while the total input of neon is balanced by total exhaust by the end of a discharge, particle balance is not observed during the course of the discharge. A significant wall inventory with a short release time (~ 10 ms) is surmised.