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Neon Enrichment and Particle Balance During “Puff and Pump” Experiments on DIII-D,¹

M.R. WADE, Oak Ridge National Laboratory, S.L. ALLEN, R.D. WOOD, Lawrence Livermore National Laboratory, M.J. SCHAFFER, W.P. WEST, General Atomics, R. MAINI, Oak Ridge Associated Universities, D.G. WHYTE, INRS-Energie et Materiaux — We report the results of experiments conducted on DIII-D with simultaneous external D₂ gas injection (~ 100 – 200 torr- ℓ /s) and divertor exhaust to assess the dependence of scrape-off-layer flow on divertor retention of neon. During these experiments, direct measurements have been made of the neon concentration in the core (CER spectroscopy) and divertor (SPRED UV spectroscopy) plasmas and in the exhaust gas (modified Penning gauge). In these experiments, exhaust enrichment (ratio of neon fraction in exhaust gas to the neon fraction in the core plasma) is in the range 1–2, suggesting that significant compression of neon in the divertor plasma is difficult. Systematic scans of various parameters expected to determine divertor retention (e.g., external D₂ gas flow magnitude and location, divertor recycling, ELM frequency, gas fueling) have been carried out. Particle balance analysis suggests that wall retention is likely a major player in the overall neon particle balance in these discharges.

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