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Theory Experiment

OEDGE Modeling of Power Balance in DIII-D Density Scan Discharges Leading to Detachment,* J.D. Elder, P.C. Stangeby, *U. Toronto*; A.W. Leonard, B.D. Bray, N.H. Brooks, *GA*; J.G. Watkins, *SNL*; E.A. Unterberg, *ORNL*; A.G. McLean, *LLNL* – The OEDGE code is used to model the outer divertor plasma for discharges from a density scan experiment on DIII-D. In this experiment the plasma density was increased over a series of L-mode and H-mode discharges starting with both targets attached and ending with both targets fully detached. These discharges used large X-point sweeps to obtain 2D Thomson profiles of the divertor plasma, target Langmuir probe profiles and spectroscopic emission profiles. OEDGE is run with a plasma solution consistent with divertor Thomson measurements and target recycling fluxes. This reproduces the experimental hydrogenic emissions. Carbon sources are then modeled in OEDGE to try to match the carbon experimental spectroscopic emissions. The combination of total hydrogenic and total carbon radiated power is then compared to outer divertor bolometric measurements. This process assesses the consistency of both the model and the experimental measurements of radiative power balance and identifies whether additional power terms may be required.

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