Abstract Submitted
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Edge neutral density radial profiles in open and closed divertor conditions using Balmer series spectroscopy on DIII-D[1] KIRTAN DAVDA, University of Tennessee, EZEKIAL UNTERBERG, AARON SONTAG, Oak Ridge National Laboratory, MORGAN SHAFER, General Atomics, DIII-D TEAM — Upstream radial profiles of Dα656.3 nm and Dγ434.0 nm have been measured across the outboard midplane separatrix, while the strike points are placed in the closed, upper divertor and the open, lower divertor in L-mode and ELMy H-mode plasma. This provides a radial neutral density profile, n(r), of the main fueling species in this region. Analysis of edge n(r) ranging from strongly attached to detached conditions will be presented to compare the effects of divertor geometry on neutral leakage. Initial results using only Dα comparing lower and upper single-null configurations show neutral densities to be higher at the open, lower-single-null case far from the separatrix, but lower than the closed upper-single-null configuration near the separatrix with very large uncertainty. By using multiple Balmer emission lines (Dα, Dγ) at the same lines-of-sight, a more consistent edge n(r) is expected by cross-checking the profiles from each calculation against one another, thus reducing the possible uncertainties when estimating n(r) from a single Balmer emission line, e.g. from atomic physics effects such as photon reabsorption at high n_e. The use of the integrated synthetic diagnostic code, CHERAB, provides an analysis work-flow to facilitate this multi-emission line approach.

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