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[ ] Theory [X] Experiment [ ] Combined/General

The relation between upstream radial widths of n_e and T_e and outer target power width for H-mode discharges in DIII-D,*

P.C. Stangeby, J.D. Elder, *U. Toronto*; J.A. Boedo, *UCSD*; M.A. Makowski, C.J. Lasnier, *LLNL*; A.W. Leonard, *GA* – For H-mode discharges in DIII-D, the relation between the power width at the outer target, $\lambda_{q_{target}}$, and the radial profiles near the outside midplane is in somewhat better agreement with flux-limited (weak collisionality) electron parallel heat conduction, $q_{\parallel} \propto n_e T_e^{3/2}$, i.e. $\lambda_{q_{target}}^{flux-lim} = [3/(2\lambda_{T_e}^{up}) + 1/\lambda_{n_e}^{up}]^{-1}$, than Spitzer (collisional) electron parallel heat conduction, $\lambda_{q_{target}}^{Spitzer} = (2/7)\lambda_{T_e}^{up}$. It appears that cross-field transport is the basic controlling process of SOL widths, manifesting itself most directly in upstream widths, with parallel transport and volumetric losses in the SOL/divertor then controlling the relation between upstream and target widths. For an initial data set of three discharges it was found that $\lambda_{q_{target}}^{measured}/\lambda_{q_{target}}^{flux\text{-}lim} = 0.93$, 0.90, 1.00 while $\lambda_{q_{target}}^{measured}/\lambda_{q_{target}}^{Spitzer} = 1.32$, 0.71, 1.21. Further results will be reported for discharges in upcoming experiments. We find that for DIII-D H-mode shots, the strongest dependence for $\lambda_{q_{target}}^{measured}$ is I_p^{-1}. The separate contributions of $\lambda_{n_e}^{up}$, $\lambda_{T_e}^{up}$ to the observed I_p scaling is assessed.

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