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, $\lambda_{q_{\text{target}}}$, and the radial profiles near the outside midplane is in somewhat better agreement with flux-limited (weak collisionality) electron parallel heat conduction, $q_{\text{flux-lim}} \propto n_e T_e^{3/2}$, i.e. $\lambda^\text{flux-lim}_{q_{\text{target}}} = [3/(2 \lambda_{up}^{up} T_e) + 1/\lambda_{up}^{up}]^{-1}$, than Spitzer (collisional) electron parallel heat conduction, $\lambda^\text{Spitzer}_{q_{\text{target}}} = (2/7) \lambda_{up}^{up} T_e$. 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 $\lambda^\text{measured}_{q_{\text{target}}} / \lambda^\text{flux-lim}_{q_{\text{target}}} = 0.93$, 0.90, 1.00 while $\lambda^\text{measured}_{q_{\text{target}}} / \lambda^\text{Spitzer}_{q_{\text{target}}} = 1.32$, 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 $\lambda^\text{measured}_{q_{\text{target}}}$ is $I_p^{-1}$. The separate contributions of $\lambda_{n_e}^{up} \lambda_{T_e}^{up}$ to the observed $I_p$ scaling is assessed.

*Supported by US DOE under DE-FG02-07ER54917, DE-AC52-07NA27344 and DE-FC02-04ER54698.