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**Transport Dependence on Safety Factor Profile in DIII-D Steady-state Discharges**[1] C.T. HOLCOMB, LLNL, J.R. FERRON, T.C. LUCE, J.C. DEBOO, GA, A.E. WHITE, MIT-PSFC, T.L. RHODES, L. SCHMITZ, UCLA, F. TURCO, ORAU — An analysis of the transport dependence on the safety factor in steady-state scenario discharges is presented based on experimental scans of $q_{95}$ and $q_{min}$ at fixed $\beta_N$ and $B_T$. Electron and ion density and temperature decrease with $q_{95}$. $T_e$ and $T_i$ increase and broaden with $q_{min}$. Power balance calculations show ion thermal diffusivity $\chi_i$ increases with $q_{95}$ and somewhat with $q_{min}$, but $\chi_e$ decreases with $q_{min}$. Measured low-k density turbulence increases strongly with $q_{min}$ and weakly with $q_{95}$ in rough agreement with the $q$-dependence of $\chi_i$ but not $\chi_e$. TGLF drift wave linear stability analysis predicts mid-radius growth rates at all k decrease with increasing $q_{95}$ and increase with increasing $q_{min}$. This disagrees with the observed $\chi_i$ increase with $q_{95}$, is consistent with the increase in $\chi_i$ with $q_{min}$, and is at odds with the observed decrease in $\chi_e$ with $q_{min}$. Calculations of the critical gradient for low-k modes and nonlinear stability analysis with mode coupling will be presented.

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