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Transport Dependence on Safety Factor Profile in DIII-D Steady-state Discharges,[*] C.T. Holcomb, *LLNL*; J.R. Ferron, T.C. Luce, J.C. DeBoo, *GA*; A.E. White, *MIT*; 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 β_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 χ_i increases with q_{95} and somewhat with $q_{\min}$, but χ_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 χ_i but not χ_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 χ_i increase with q_{95}, is consistent with the increase in χ_i with $q_{\min}$, and is at odds with the observed decrease in χ_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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