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Particle Transport and Turbulence Dependence on Collisionality on DIII-D and Comparisons to GYRO and TGLF[1] L. ZENG, E.J. DOYLE, T.L. RHODES, W.A. PEEBLES, U. California-Los Angeles, G.M. STAEBLER, C.C. PETTY, General Atomics, G.R. MCKEE, U. Wisconsin-Madison — Understanding of the physics of collisionality (ν^*) dependence of particle transport is critically important in extrapolating existing experiments to the burning plasma regime as it governs the peaking of the plasma density profile and impurity accumulation. Recent studies of particle transport have been facilitated by the significant new measurement and modeling capabilities in DIII-D. High resolution profile reflectometry measurements during L-mode plasmas have revealed an insensitivity of the electron density peaking to ν^* variation for a factor of $3-5$, in contrast to the H-mode scaling results. Simultaneous measurements indicate a broadening of the intermediate-k turbulence as ν^* increases, suggesting a change in the underlying turbulence dynamics. Initial estimates for the trends in particle fluxes appear consistent with GYRO predictions. Detailed comparisons of measured perturbative particle diffusion coefficient and pinch velocity to the predictions of TGLF, which can simulate both perturbative and equilibrium transport rates now, are ongoing.

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