

Experimental and Gyrokinetic Comparison of L, I, and H-Mode Impurity Transport

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Three distinct confinement regimes (L, I, and H-mode) have been identified on Alcator C-Mod. Compared to L-mode confinement which has been extensively studied, low collisionality, peaked H-modes and the recently identified I-mode confinement regime have received relatively little attention but both exhibit unique characteristics associated with their particle transport. In this study the core impurity transport for each confinement regime is investigated using a novel x-ray spectrometer measurement of He-like calcium and laser blow-off impurity injection. The impurity transport code STRAHL has been coupled with a χ^2 minimization to determine experimental impurity transport profiles [$r/a < 0.65$]. Realistic error bars are generated for these profiles by means of Monte Carlo error analysis. Using the Trapped Gyro Landau Fluid code, TGLF, linear stability of each confinement regime will be correlated with changes in energy transport and the derived impurity transport coefficients. Experimental results will also be compared with impurity transport derived from full physics global, nonlinear GYRO simulations as part of an ongoing model validation effort.