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Theory Experiment

Analytic Electron Density Barrier Model, Including Edge Transport Barrier,* N.D. Daniels, *U. Montana-Missoula*, R.J. Groebner, *General Atomic* – In H-mode, DIII-D density profiles have steep edge gradients that become flatter in the core. The width of the steep gradient region (pedestal) could be due to either fueling by edge neutrals or the presence of a transport barrier or both. An analytic model of the density profile is being developed to include both effects. The model has two transport regions with particle diffusion coefficients D_c and D_b , representing the core and transport barrier regions respectively. The model is derived from coupled continuity equations for the electron and neutral densities which are solved in both regions. The resulting analytic model will allow for a study of the combined effects of the transport barrier and fueling depth, and will provide an expression for the width of the density pedestal as a function of the pedestal height. The predictions of this model will then be compared to observed trends in experimental data.

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