

Abstract Submitted
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Determination of the Radial Electric Field in the DIII-D Edge Pedestal Plasma¹ T.M. WILKS, W.M. STACEY, GA Tech, T.E. EVANS, GA — A self-consistent calculation for the radial electric field in the edge plasma for a representative H-mode DIII-D discharge is presented. The complex interrelationships between edge physics phenomena such as rotation, radial ion fluxes, momentum transport, and the radial electric field are maintained by momentum balance requirements. Modeling efforts include fast and thermal ion orbit loss, return currents, x-transport, and a non-axisymmetric rotation formulation, and their effect on radial particle flux, rotation, and the radial electric field. Recent improvements to the non-axisymmetric rotation model demonstrate a new leading order viscosity term contributing further to toroidal rotation damping via non-axisymmetric magnetic fields, which affect the electric field calculation specifically in the edge pedestal region. The new ion orbit loss and rotation model calculations are compared to experiment to show good agreement with the characteristic “well” structure for the radial electric fields in H-mode plasmas.

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