

Abstract Submitted
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Edge Radial Electric Field and Ion Orbit Loss in DIII-D¹ J.S. DEGRASSIE, R.J. GROEBNER, GA, J.A. BOEDO, UCSD, B.A. GRIERSON, PPPL — The edge radial electric field, E_r , may be largely determined by the value necessary to supply the neoclassical return current to balance the loss current due to ion orbit loss. This is the indication from a phenomenological model, motivated by recent Mach Probe measurements of the edge co- I_p flow layer in DIII-D [1,2], based on a simple empty loss cone orbit loss model [3,4]. Probe and charge exchange recombination measurements also show a relatively large positive edge E_r just inside the LCFS in Ohmic conditions, ~ 10 kV/m, which is explained in this model by the propensity of the flow layer to drive return current. The E_r level is also dependent on Z_{eff} in the edge lower Z_{eff} promotes greater negative E_r for current balance. The model will be compared with measurements in Ohmic, L- and H-mode conditions.

[1] J.A. Boedo et al., Phys. Plasmas 18, 035510 (2011).

[2] S.H. Müller et al., Phys. Rev. Lett. 106, 115001 (2011).

[3] J.S. deGrassie et al., Nucl. Fusion 49, 085020 (2009).

[4] J.S. deGrassie et al., Nucl. Fusion 52, 013010 (2012).

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