

**Abstract Submitted for the 55th Annual Meeting  
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Theory  Experiment

**Ion Orbit Loss Effect on Structure of Radial Electric Field,**  
T.M. Wilks, W.M. Stacey, *Georgia Tech*; T.E. Evans, *General  
Atomics* – The radial electric field is an important factor in the L-H  
transition, the onset of edge localized modes (ELMs), etc. Therefore  
the causes and trends of the radial electric field in the edge and  
scrape off layer regions are of interest. As part of an investigation of  
mechanisms for controlling the electric field in the edge plasma, the  
effects of ion orbit loss and the compensating ion return current on  
the radial electric field in the edge region and scrape off layer are  
analyzed. Both thermalized plasma ions and fast ion losses are  
considered in the investigation, and shown to have implications on  
the toroidal and poloidal rotation velocity profiles, which are closely  
linked to the radial electric field. Local density and temperature  
profiles are taken into account in order to model the fraction of ions  
that pass the separatrix, but orbit back into the edge plasma. The  
inclusion of fast beam ions along with the orbit loss of thermal ions  
and the compensating return ion current is found to have a significant  
effect on the structure of the radial electric field in the edge pedestal.

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