Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

High-resolution numerical schemes for cross-magnetic-field drift in UEDGE and comparison with impurity flow measurements[1] S.K. NAM, G. PORTER, T.D. ROGNLIEN, Lawrence Livermore National Laboratory, J. HOWARD, Australian National University — A first order upwind scheme has been employed by the UEDGE edge transport code for the cross-magnetic-field drift terms even though it induces numerical diffusion. In a steep gradient H-mode, the physical diffusion coefficient is believed to be small in the transport barrier region where numerical diffusion may be as large as, or even exceed, the physical diffusion. Therefore the first order upwind scheme can degrade simulation results especially currents in the scrape-off-layer. An approach by Rozhansky et al. reduces radial numerical diffusion at the expense of a larger poloidal numerical diffusion. Here an alternate approach of higher-order schemes are investigated for UEDGE. The convergence and accuracy of the new numerical schemes are compared to the first order upwind scheme. These numerical improvements are further tested in comparing simulations with edge carbon flow measurements using a new Fourier Transform Spectrometer on DIII-D.

[1]Prepared by LLNL under Contract DE-AC52-07NA27344.

S.K. Nam
Lawrence Livermore National Laboratory

Date submitted: 20 Jul 2010 Electronic form version 1.4