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Comparison of cross-magnetic-field drift algorithms in UEDGE.[1]
S.K. NAM, T.D. ROGNLIEN, LLNL — Inclusion of ExB, gradient-B, and curvature drift terms in 2D edge plasma transport codes typically results in substantially slower convergence or lack of convergence for obtaining steady-state profiles. Those cases where convergence is obtained show that drifts can have a strong effect of the scrape-off layer plasma profiles and flows, and thus improvement of the efficiency and robustness of edge transport codes with drifts is a high priority, especially as these codes become components within integrated whole-device models. Rozhansky *et al.* [Nucl. Fusion 49 (2009) 025007] have proposed a new numerical formulation of the drift terms, and it is shown to improve the SOLPS code performance and accuracy, though an artificial stabilizing diffusive term is still required beyond the physical turbulent diffusive term. While the fully implicit algorithm in UEDGE requires no separate stabilizing term, it often does exhibit convergence difficulties for steep-gradient cases. Results from UEDGE implementation of the Rozhansky algorithm are presented and compared to the original algorithm for performance and accuracy.

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