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ITR/P1-29: PTRANSP Tests of TGLF and Predictions for ITER

Tuesday, October 9, 2012 8:30 AM (4 hours)

Time-dependent integrated predictive modeling is important for helping ITER achieve the physics goals of studying reactor-relevant burning plasmas. The PTRANSP code is being used to generate time-dependent integrated predictions. These are self-consistent in that the heating, current-drive, torques and equilibria are calculated using predicted plasma profiles, and vice versa.
Predictions for ITER have incorporated physics-based models such as GLF23. An improved Trapped gyro-Landau Fluid model TGLF contains physics not included in GLF23 such as realistic shaped finite aspect ratio flux geometry, and collisionality. TGLF achieves more accurate predictions of temperatures measured in L-mode, H-mode and hybrid discharges than does GLF23. This paper describes a major upgrade to PTRANSP which implements TGLF. The upgrade uses a new robust solver for stiff transport models.
Both GLF23 and TGLF are incorporated. The solver has both standalone and PTRANSP-coupled modes. The implementation of TGLF is verified by comparing results derived using the XPTOR code, and is tested using H-mode ITER-like plasmas. Predictions for ITER plasmas are given and compared with predictions using GLF23.

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Collaboration (if applicable, e.g., International Tokamak Physics Activities)

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