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Implementation of plasma turbulence model for tokamak scrape-off layer and divertor[1] M.V. UMANSKY, B.I. COHEN, Lawrence Livermore Natl Lab, J.R. MYRA, Lodestar Research Corporation — Tokamak edge turbulence model SOLT3D for scrape-off layer and divertor is motivated by the older model SOLT [1], which in spite of its relative simplicity has produced a number of encouraging results. The original SOLT model solves for time-evolution of plasma density, temperature, and electrostatic potential in a 2D plane perpendicular to the magnetic field B in the outboard mid-plane region of the tokamak; the dynamics along the magnetic field is approximated by a parallel scale length parameter. The new SOLT3D model, being developed in the BOUT++ framework [2], roughly follows the original SOLT design but includes the dimension along the magnetic field line and solves for parallel variations of plasma fields and for electron dynamics along the magnetic field line. The model supports linear instabilities relevant to SOL turbulence: drift-resistive-ballooning mode instability driven by the magnetic curvature and the radial gradient of plasma pressure, and the conducting-wall mode instability driven by the end-plate sheath boundary conditions and radial gradient of plasma temperature. Testing of the model includes verification of linear dispersion relations and some known nonlinear solutions. [1] Russell et al., Phys. Plas. **22**, 092311 (2015); [2] Dudson et al. Comp. Phys. Comm. **180**, 1467–1480 (2009).

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