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Blended Kinetic Simulations of Turbulent Transport in C-2W CALVIN LAU, TAE Technologies, Inc., ZHIHONG LIN, University of California, Irvine, TOSHIKI TAJIMA, University of California, Irvine; TAE Technologies, Inc., SEAN DETTRICK, TAE Technologies, Inc., LOTHAR SCHMITZ, University of California, Los Angeles; TAE Technologies, Inc., THE TAE TEAM, TAE Technologies, Inc. — In TAE Technologies current device, C-2W (also called Norman), advanced beam-driven FRC plasmas are produced and sustained in steady state. In past C-2U FRC plasmas, Doppler Backscattering (DBS) measurements reveal distinct density fluctuation spectra in the core and scrape-off layer (SOL) regions. Gyrokinetic microturbulence simulations using the cross-separatrix particle-in-cell ANC code show that the distinct fluctuation spectra arise from the interaction of of the two regions: unstable modes grow in the SOL where energy cascades from shorter to longer toroidal wavelengths; the smaller scale fluctuations can spread across the separatrix into the core. Recently, a blended particle model, based on the drift-Lorentz mover, valid throughout the FRC, has been implemented in ANC. This allows for the correct representation of particle trajectories across the low magnetic field regions of the FRC. In addition, the blended model is used to include the non-adiabatic electron response, enabling the self-consistent calculation of particle and heat fluxes for ions and electrons. Simulations of C-2U plasma shows a change in linear mechanism but nonlinear fluctuation spectra remain similar as before. Preliminary simulations of C-2W plasma will also be presented.

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