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Simulation of Plasma Transport in a Toroidal Annulus with TEMPEST[1] Z. XIONG, X.Q. XU, B.I. COHEN, R. COHEN, M.R. DORR, J.A. HITTINGER, G. KERBEL, W.M. NEVINS, T. ROGNLIEN, Lawrence Livermore National Laboratory — TEMPEST is an edge gyro-kinetic continuum code currently under development at LLNL to study boundary plasma transport over a region extending from inside the H-mode pedestal across the separatrix to the divertor plates. Here we report simulation results from the 4D (θ, ψ, E, μ) TEMPEST, for benchmark purpose, in an annulus region immediately inside the separatrix of a large aspect ratio, circular cross-section tokamak. Besides the normal poloidal trapping regions, there are radial inaccessible regions at a fixed poloid angle, energy and magnetic moment due to the radial variation of the B field. To handle such cases, a fifth-order WENO differencing scheme is used in the radial direction. The particle and heat transport coefficients are obtained for different collisional regimes and compared with the neo-classical transport theory.

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