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Neoclassical orbit calculations with a full-f code for tokamak edge plasmas[1] T.D. ROGNLIEN, R.H. COHEN, M. DORR, J. HITTINGER, X.Q. XU, LLNL, P. COLLELA, D. MARTIN, LBNL — Ion distribution function modifications are considered for the case of neoclassical orbit widths comparable to plasma radial-gradient scale-lengths. Implementation of proper boundary conditions at divertor plates in the continuum TEMPEST code, including the effect of drifts in determining the direction of total flow, enables such calculations in single-null divertor geometry, with and without an electrostatic potential. The resultant poloidal asymmetries in densities, temperatures, and flows are discussed. For long-time simulations, a slow numerical instability develops, even in simplified (circular) geometry with no endloss, which aids identification of the mixed treatment of parallel and radial convection terms as the cause. The new Edge Simulation Laboratory code, expected to be operational, has algorithmic refinements that should address the instability. We will present any available results from the new code on this problem as well as geodesic acoustic mode tests.

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