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Radial Propagation in the ITG CYCLONE Base Case[1] ERIC WANG, WILLIAM NEVINS, Lawrence Livermore National Labs — Analysis of the ITG CYCLONE benchmark [A.M. Dimits et al, Phys. Plasmas 7, 969 (2000)] in the past focused on the characteristics of plasma microturbulence located at the outboard midplane ($\theta = 0$). The outboard midplane is chosen because this is the region of the tokamak that produces the most violent instabilities, while the third spatial is ignored because plasma microturbulence in tokamaks is anisotropic, with short spatial variations perpendicular to the magnetic field and long variations parallel. In the present work we revisit the CYCLONE base case using the nonlinear gyrokinetic microturbulence code GYRO[J. Candy and R.E. Waltz, J. of Comp. Phys., Volume 186, Issue 2, 10 April 2003], observing steady state turbulence in all three spatial dimensions plus time. Unexpectedly, the perturbed quantities (electrostatic potential, density, and temperature) all exhibit radial propagation inwards for spatial positions above the outboard midplane ($\theta < 0$) and outwards below the outboard midplane ($\theta > 0$). The characteristics of this propagation are presented in detail, along with a model for the cause of these structures.

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